太阳底下的新鲜事

Something New Under the Sun

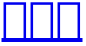
20世纪人与环境的全球互动

An Environmental History of the Twentieth-Century World

[美]约翰·R. 麦克尼尔(John R. McNeill)著 李芬芳 译

中信出版集团

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[illegible]1900[illegible]400[illegible]18[illegible]1760[illegible]inanimate energy[illegible]animate energy[illegible]·[illegible]José Martí[illegible]H.G.[illegible]H.G.Wells[illegible]

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[illegible]20[illegible]·[illegible]“[illegible]”[illegible]“[illegible]”[illegible]sphere[illegible]lithosphere[illegible]pedosphere[illegible]atmosphere[illegible]hydrosphere[illegible]biosphere[illegible]20[illegible]20[illegible]100[illegible]1900[illegible]1000[illegible]10[illegible]

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]feedback loop[illegible]

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[illegible]

[illegible]·[illegible]Paul Kennedy[illegible]

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niche Lebensraum genetic footprint

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[illegible]20[illegible]1991[illegible]

[illegible]

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[illegible]

[illegible]·[illegible]Robert Benchley[illegible]·[illegible]Arnold Tonybee[illegible]*The Roman Revolution from the Flora’s Point of View*[illegible][1][illegible]20[illegible]

[illegible]

——Murray-Darling basin

[1]Toynbee 1965,2：585–99.

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Fulbright … University of Otago … · … Rob Rabel … · … Erik Olsen … Woodrow Wilson International Center for Scholars … 1996 … 1997 … · … Temma Kaplan … · … Wolf Fischer … · … Christian Kannwischer … · … Peter Kocsis … · … Angeliki Papantoniou … Toshuko Shironitta … 1997 … 1998 … Guggenheim Foundation …

… Massey University … University of Canterbury … United States Environmental Protection Agency … Futures Group …

… Norton’s Global Century series … · … Paul Kennedy … · … Steve Forman … · … Susan Middleton …

… · … Julie Billingsley …

[illegible]

[illegible]

——G.K.[illegible]G.K.Chesterton[illegible]1933[illegible]

[illegible]40[illegible]400[illegible]20[illegible]

[illegible]“[illegible]”[illegible][1][illegible]20[illegible]

[illegible]20[illegible]20[illegible]

[illegible]20[illegible]100[illegible]1945[illegible]20[illegible]20[illegible]

[illegible]20[illegible]50[illegible]2[illegible]

[illegible]nonlinear effects[illegible]20[illegible]30[illegible]Sudetenland[illegible]1939[illegible]9[illegible]6[illegible]26℃[illegible]20[illegible]

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[illegible]20[illegible]

[illegible]1500[illegible]

[illegible]GDP[illegible]

500[illegible]GDP[illegible]20[illegible]90[illegible]2400[illegible]GDP[illegible][2][illegible]1500[illegible]1500[illegible]1820[illegible]GDP[illegible]6950[illegible]1990[illegible]1820[illegible]1900[illegible]GDP[illegible]1.98[illegible]1990[illegible]GDP[illegible]1870[illegible]1913[illegible]30[illegible]1914[illegible]1945[illegible]1950[illegible]GDP[illegible]5.37[illegible]1991[illegible]1992[illegible]GDP[illegible]28[illegible]A.1[illegible]

[illegible]A.1 1500—1992[illegible]GDP[illegible]

年份	全球 GDP[a]
1500	100
1820	290
1870	470
1900	823
1913	1136
1929	1540
1950	2238
1973	6693
1992	11664

[illegible]Maddison 1995[illegible]19,227

[illegible]a[illegible]GDP[illegible]1500[illegible]

20[illegible]1500[illegible]120[illegible]1820[illegible]1950[illegible]1973[illegible]“[illegible]”[illegible][3]

[illegible]A.2[illegible]1500[illegible]120[illegible]9[illegible][4][illegible]

[illegible]A.2 1500[illegible]GDP

年份	全球人均 GDP（以 1900 年美元计算）	指数（1500 年为 100）
1500	656	100
1820	651	117
1900	1263	224
1950	2138	378
1992	5145	942

续表

[illegible]Maddison 1995[illegible]228

[illegible]1500[illegible]9[illegible]1900[illegible]4[illegible]1500[illegible]500[illegible]20[illegible]“[illegible]”[illegible]creative destruction[illegible][5][illegible]30[illegible]

[illegible]

[illegible]1900[illegible]

[illegible]8000[illegible]200[illegible]2000[illegible][6][illegible]10[illegible]1000[illegible]1%[illegible]2[illegible]3[illegible]1500[illegible]4[illegible]5[illegible]1500[illegible]0.1%[illegible]1500[illegible]1730[illegible]7[illegible][7][illegible]1820[illegible]10[illegible]A.3[illegible]

[illegible]A.3 1820[illegible]

年份	人口（单位：10亿）	年增长率（%）
1820	1	—
1850	1.2	0.5（1820—1849）
1900	1.6	0.6（1850—1899）
1950	2.5	0.8（1900—1949）
1990	5.3	1.8（1950—1989）
2000	6.0	1.5（1990—1999）

[illegible]Cohen 1995[illegible]79 and app.2

18[illegible]1950[illegible]50[illegible]100[illegible]20[illegible][8]20[illegible]20[illegible]

[illegible][9][illegible]400[illegible]800[illegible]800[illegible]2.16[illegible]2.16[illegible]

[illegible]28%[illegible]1750[illegible]20%[illegible]1900[illegible]13%[illegible]1950[illegible]20[illegible]0.00025%[illegible]400[illegible]100[illegible]1/5[illegible]

[illegible]

[illegible]1820[illegible]

[illegible]

[illegible]biomass[illegible]

[illegible]“[illegible]”[illegible]

[illegible][10][illegible]efficiency ratings[illegible]18%[illegible]100[illegible]18[illegible]10%[illegible]

[illegible][11][illegible]“[illegible]”[illegible]somatic energy regime[illegible]

[illegible]shifting agriculture[illegible]10[illegible]settled agriculture[illegible]10[illegible]positive energy regime[illegible]1000[illegible]1800[illegible][12][illegible]

[illegible]

[illegible]20[illegible]direct solar energy[illegible]

[illegible]flywheel[illegible]

[illegible]

[illegible]1000[illegible][13][illegible]

[illegible]
[illegible]“[illegible]”[illegible]exosomatic energy regime[illegible]1800[illegible]

[illegible][14][illegible]18[illegible]

[illegible]99%[illegible]1800[illegible]5%[illegible]20[illegible]200[illegible]1900[illegible]1800[illegible]30[illegible]19[illegible]1800[illegible]1000[illegible]1900[illegible]100[illegible][15]

[illegible]1900[illegible]·[illegible]James Young[illegible]19[illegible]50[illegible]·[illegible]Edwin Drake[illegible]1859[illegible]1880[illegible]

[illegible]1900[illegible]19[illegible]90[illegible]20[illegible]A.4[illegible]A.5[illegible]20[illegible][16][illegible]1890[illegible]“[illegible]”[illegible]

[illegible]A.4 [illegible]1800—1990[illegible]

燃料种类	产量（百万吨）		
	1800	1900	1990
生质燃料	1000	1400	1800
煤炭	10	1000	5000
石油	0	20	3000

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□A.5 □□□□□1800—1990□□

	1800	1900	1990
总量（单位：百万吨油当量）	250	800	10000
指数（1900 年为 100）	31	100	1250

□□□□□□□Smil 1994□187

□□□□□□□□□□□19□□□□□□□□□□□□□□□5□□□□□20□□□□□□□□□□□□□1950□□□□□□□[17]□□□□□□□□□□□□16□□□□□□□□□□□□□□□□□□□□□□□1000□□□□□□□□□□□□□□□□□□□20□□□□1900□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□20□□□□□□□□□□□1900□□□1000□□□□□10□□□□□□□□□1900□□□100□□□□□□□□□□□□□□20□□□□□□□□□□□□

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365[illegible]24[illegible][18]

[illegible]2[illegible]3[illegible]1950[illegible]20[illegible]90[illegible]50[illegible]100[illegible]75[illegible]20[illegible]60[illegible]

[illegible]19[illegible]60[illegible]20[illegible]

[illegible]

[illegible]19[illegible]20[illegible]14[illegible]4[illegible]4[illegible]19[illegible]5[illegible]20[illegible]16[illegible]

[illegible]18[illegible]1550[illegible]1850[illegible]

[illegible]18[illegible]60[illegible]

[illegible]1950[illegible]

[illegible]20[illegible]1900[illegible]20[illegible]

[1]Frank,1947.

[2][illegible]1990[illegible]-[illegible]Geary-Khamis dollar[illegible]Maddison 1995[illegible]19[illegible]

[3][illegible]1820[illegible]

[4][illegible]1500[illegible]GDP[illegible]120[illegible]GDP[illegible]9[illegible]13[illegible]1500[illegible]

[5][illegible]·[illegible]Joseph Schumpeter[illegible]20[illegible]

[6]Cohen 1955[illegible]77.

[7]18[illegible]Livi-Bacci 1992[illegible]

[8][illegible]Cipolla 1978[illegible]89[illegible]

[9]Biraben 1979[illegible]16[illegible]Bourgeois-Pichat 1988[illegible]Livi-Bacci 1992[illegible]32–3[illegible]Westing 1981[illegible]500[illegible]Keyfitz 1996[illegible]690[illegible]Haub 1995[illegible]1050[illegible]Westing[illegible]30[illegible]Keyfitz[illegible]100[illegible]

[10][illegible]gravitational energy[illegible]

[11][illegible]Cipolla 1978[illegible]35–69[illegible]Debeir et al.1986[illegible]Smil 1994[illegible]

[12]Smil 1994[illegible]226[illegible]Cipolla 1978[illegible]53[illegible]80%[illegible]85%[illegible]

[13][illegible]1[illegible]1[illegible]

[14]Sϕrensen 1995[illegible]392–404[illegible]

[15]Smil 1994[illegible]186[illegible]Cipolla 1978[illegible]56[illegible]1800[illegible]1500[illegible]1900[illegible]7.01[illegible]

[16]1994[illegible]40%[illegible]27%[illegible]23%[illegible]7%[illegible]3%[illegible]1%[illegible]WRI 1996[illegible]276–7[illegible]20[illegible]90[illegible]25[illegible]

[17][illegible]1800[illegible]80[illegible]Starr 1996[illegible]244[illegible]1850[illegible]50[illegible]Levi-Bacci 1992[illegible]28[illegible]Smil[illegible]

[18][illegible]

[illegible] [illegible]

[illegible]6[illegible]

[illegible]20[illegible]1900[illegible]——[illegible]

[illegible][1]

[1]Turner nt al 1990[illegible]393–466[illegible]

[illegible]1[illegible] [illegible]

[illegible]

——[illegible]Virgil[illegible]*Georgics*[illegible]

[illegible]20[illegible]geological agent[illegible]

[illegible][1][illegible]20[illegible]

[illegible]

[illegible]120[illegible]——[illegible]

[illegible][2]

[illegible]

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19

“ ” superphosphate

1842 · John Lawes 1814—1900

1888 1921

Kolal Peninsula 1930

1937

[3] 20

20 [4]

19

1909 Fritz Haber

· Karl Bosch —

1868 Silesia Breslau

1892

30 Karlsruhe

1900 1/3

nitrogen fixation

[illegible]—[illegible]1918[illegible]—[illegible][5]

[illegible]1916[illegible]1919—1926[illegible]1933[illegible]20[illegible][6][illegible]·[illegible]Jonathan Swift[illegible]1726[illegible]“[illegible]”[illegible]200[illegible][7]

[illegible]—[illegible]1929—1938[illegible]1940[illegible]400[illegible]1965[illegible]4000[illegible]1990[illegible]1.5[illegible][8][illegible]

[illegible]20[illegible]30%[illegible][9][illegible]1950—1985[illegible]20[illegible]60[illegible]1970[illegible]

[illegible]eutrophication[illegible]5[illegible]“[illegible]”[illegible][10]

[illegible]1950[illegible]——[illegible]2/3[illegible]

[illegible]

20[illegible]

[illegible]20[illegible]20[illegible]1875—1975[illegible]20[illegible][11][illegible]

[illegible]1868[illegible]19[illegible]20[illegible]1926[illegible]“[illegible]”[illegible]“[illegible]”[illegible]1950[illegible]1973[illegible]1980[illegible]10%[illegible]20[illegible][12]

[illegible]20[illegible]70[illegible]Sadbury[illegible]400[illegible]1970[illegible]20[illegible]80[illegible]Hesse[illegible][13]20[illegible]10[illegible]100[illegible]20[illegible]70[illegible]3000[illegible]20[illegible][14]

[illegible]19[illegible]20[illegible]1900[illegible]1000[illegible]15[illegible][15][illegible]1940[illegible]1982[illegible]350[illegible]1940[illegible]1950[illegible]50%[illegible]

70%[illegible]

[illegible]1980[illegible]1936[illegible]80%[illegible]85%[illegible][16][illegible]1976—1980[illegible]Love Canal[illegible]1942—1953[illegible]Hooker Chemical Company[illegible]1980[illegible]1980[illegible]5[illegible]Superfund[illegible]

[illegible]20[illegible]70[illegible]1989[illegible]1989—1990[illegible]20[illegible]80[illegible]1987[illegible]20[illegible]80[illegible]90[illegible][17]

[illegible]1941[illegible][18]

1950[illegible]1975[illegible]

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[illegible]20[illegible]

1.1□□□□□20□□90□□□□□□□□□□□□□□□□□20□□□□□□□□□□□□□□□□□20□□90□□□□□□□1/10□□□□□□□□□[19]□□□□□□□□□□□1990□□□[20]

□1.1 □□□□□□□□□□□□□□□

	单位：10 亿吨
风蚀	1.0
冰河	4.3
造山运动	14
海底火山 [a]	30
人为 [b]	42
水 [c]	53

□□□□Hooke 1994

□a□□□□□□□□□□□□□□□

□b□Hooke□□□400□□450□□□□□□□□□

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□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□1980□□□□□□□□□
□□□□□□□□□□□□□[21]□□20□□□□□□□□□□□□□□40□□□□□□□□□□□□4□5
□□[22]

□1.2 1850—1995□□□□□□□

年份	产出（单位：百万吨）	指数（1900年为100）
1800	10	1.3
1850	76	10
1875	283	37
1900	762	100
1925	1358	178
1950	1800	236
1975	3257	427
1995	5000	656

□□□□Headrick 1990□60□Erickson 1995□78□Smil 1994□186□□□□□

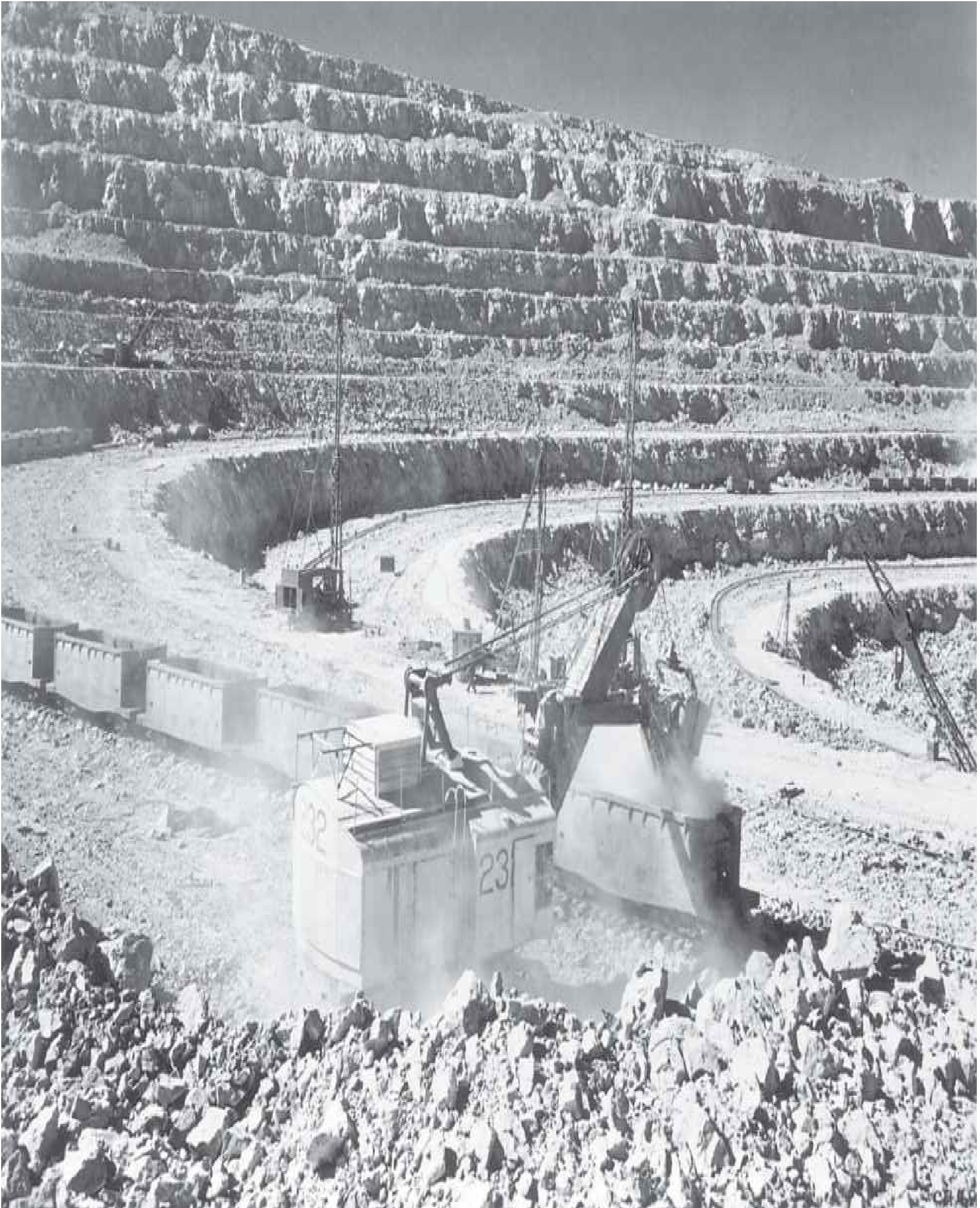
□□[23]□□□□□□□□□□□□□□□□□1966□□□□□□□□□□□□□□□□□□□□□□□□□□□Sacramento River□□□□□□□□□□□□1800—1909□□□□□□□□□10□□□□□□□□□□□□□□□□Perak River□□□□□□□□□□□□□□□□Clutha River□□□□□□□□□□□□□□□□□□□□□□□[24]□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□New Caledonia□□□□□□□□□□

□□□1840□□□

[illegible]1853[illegible]20[illegible][illegible]1/4[illegible]1/3[illegible]

[illegible]1926[illegible]1994[illegible]1890—1990[illegible]Société le Nickel,SLN[illegible]5[illegible]1[illegible]250[illegible]

[illegible]Kanak[illegible]20[illegible]30[illegible]



□□□□□□□□□□□□□□□□□□□□□□□□1944□□□□□□□Chuquicamata□□□□□□□□□□20□□
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□□□□□□□□□□□□□□□□□1980□□□□□□□□□□□□□□□□□□□□

1950[illegible]40[illegible]1960[illegible]10[illegible]1976[illegible]100[illegible]20[illegible]80[illegible]10[illegible][25]

[illegible]1880[illegible]1960[illegible]Bougainville[illegible]Panguna[illegible]1980[illegible]Ok Tedi[illegible]1980[illegible]Irian Jaya[illegible]Freeport[illegible][26][illegible][27]

[illegible]60%[illegible]80%[illegible][28]

[illegible]Miletus[illegible][29]

[illegible][30][illegible]2000[illegible]1000[illegible]

[illegible]4000[illegible]300[illegible]3000[illegible][31][illegible]11[illegible]2000[illegible]20[illegible]17[illegible]1990[illegible]22[illegible][32]

1492 1650—1700 [33] 1840 6000 Maghreb [34] [35]

Rhodesia 1890 “ ” 1918 20 30 · Jan Smuts “ ”[36] 25



1. 采矿及土壤侵蚀史主要分布图

[illegible]1920[illegible]

[illegible]cultural attachment[illegible]1890—1960[illegible][37][illegible]

[illegible]1870[illegible][38]

[illegible]Palliser Triangle[illegible]Alberta[illegible]Saskatchewan[illegible]Manitoba[illegible]1857[illegible]·[illegible]John Palliser[illegible]1885[illegible]1897[illegible]1901—1915[illegible]15[illegible]Rudyard Kipling[illegible]1907[illegible]“[illegible]”[illegible]Nineveh[illegible][39][illegible]1915[illegible]1916[illegible]

[illegible]20[illegible]20[illegible]20[illegible]30[illegible]300[illegible]400[illegible]“[illegible]”[illegible]1934[illegible]“[illegible]”[illegible]Canadian Commonwealth Federation[illegible]Canadian

Commonwealth[illegible][40]

20[illegible]20[illegible]30[illegible]19[illegible]G.V.Jacks[illegible]R.O.Whyte[illegible]“1914—1934[illegible]”[illegible][41]

[illegible]1930[illegible]20[illegible]50[illegible]60[illegible]

[illegible]20[illegible]“[illegible]”[illegible][42][illegible]20[illegible]30[illegible]1934[illegible]

[illegible]20[illegible]50[illegible]20[illegible]90[illegible]1925—1935[illegible][43][illegible][44]

[illegible]20[illegible]50[illegible]1950[illegible]

1945[illegible][45][illegible]

[illegible]

[illegible]1800[illegible]1898[illegible]

[illegible]1898[illegible]1860—1900[illegible]1920[illegible]1950[illegible]“[illegible]”[illegible]contour plowing[illegible]20[illegible]70[illegible]

[illegible]1946[illegible]1960[illegible]1989[illegible][46]

[illegible]4000[illegible]1800[illegible]20[illegible]1.3[illegible]

[illegible]1.3 1910—1996[illegible]

年份	密度（人／平方千米）
1910	50—60
1932	51
1948	80
1978	180
1992	270
1996	260[a]

[illegible]Bart 1993[illegible]Derenne 1988[illegible]1996

[illegible]a[illegible]10%[illegible]

[illegible]1919[illegible]Hutu[illegible]20[illegible]20[illegible]30[illegible]1915[illegible]“[illegible]”[illegible][47]20[illegible]50[illegible]

1961[illegible]3%[illegible]20[illegible]80[illegible]1994—1996[illegible][48]

[illegible]Machakos Hills[illegible]Nairobi[illegible]1930[illegible]1930—1990[illegible]3[illegible]6[illegible]

[illegible]20[illegible]70[illegible]Akamba[illegible][49]

[illegible]1960[illegible]8000[illegible]1930[illegible][50][illegible]

[illegible]1930[illegible]soil compaction[illegible]1950[illegible]20[illegible]20[illegible]90[illegible][51]1960[illegible]5[illegible]1990[illegible]7%[illegible]100[illegible]1945—1990[illegible]1950[illegible]“[illegible]”[illegible]salt creep[illegible][52][illegible]20[illegible]1945—1975[illegible][53][illegible]runoff[illegible]

[illegible]

[illegible]1/3[illegible]20[illegible]1/4[illegible]4.3[illegible]7[illegible]“[illegible]”[illegible][54][illegible]1978[illegible]31%[illegible][55][illegible]9[illegible]1960[illegible]20[illegible]1000[illegible]17[illegible]1982[illegible]40%[illegible][56][illegible]1994[illegible]

150[illegible][57][illegible]UNFAO[illegible]1991[illegible]0.3%[illegible]0.5%[illegible]20[illegible][58][illegible][59]

[illegible]20[illegible]1950[illegible]1970[illegible]25[illegible][60][illegible]

[illegible]20[illegible]90[illegible]20[illegible]1900[illegible]97%[illegible][61][illegible]

[1][illegible]Pimentel et al.1995[illegible]1118–9[illegible]

[2]Hillel 1991 [illegible] 23–30[illegible]Rozanov et al.1990 [illegible] 203–5[illegible]Stanners and Bourdeau 1995[illegible]147–8[illegible]geosphere[illegible]

[3]Smil 1990[illegible]431[illegible]1994[illegible]1995[illegible]10–11[illegible]

[4][illegible]

[5][illegible]20[illegible]20[illegible]Friedrich 1993[illegible]

[6]Smil 1994[illegible]182[illegible]189–90[illegible]Smil 1993[illegible]165[illegible]Goran 1967[illegible]1925[illegible]IG Farben[illegible]1931[illegible]

[7]Hillel 1991[illegible]129[illegible]132[illegible]

[8][illegible]Brown et al.1996[illegible]9[illegible]Solbrig[illegible]Solbrig 1994[illegible]215[illegible]

[9][illegible]Smil 1993[illegible]165[illegible]1/3[illegible]1/4[illegible]

[10]Wes Jackson[illegible]Opie 1993[illegible]257[illegible]Olson 1987[illegible]220–21[illegible]

[11]German Advisory Council on Global Change 1995[illegible]86[illegible]

[12]Asami 1983[illegible]1988[illegible]

[13]German Advisory Council on Global Change 1995[illegible]84[illegible]

[14]Asami 1983□Kitagishi □ Yamane 1981□Logan 1990□Nriagu 1990a □ 1996 □ 1980[illegible]3:1□□□7:1□□□25:1□□□□11:1□Brown et al.1990□439[illegible]Mielke et al.1983□

[15]Tolba and El-Kholy 1992□249□□□□□10[illegible]Prager 1993□□□8□□□

[16]Colten 1994□

[17]J.Clapp 1994□□20□□80[illegible]3000□□□□4500□□□□□20%[illegible]Prager 1993[illegible]

[18][illegible]1[illegible]330[illegible]1700□□3700[illegible]75[illegible]USDOE 1995[illegible]German Advisory Council on Global Change 1995□175□

[19][illegible]1900□□□□2000□□1/4□□□□□□1/14[illegible]

[20]Sherlock 1931□238□

[21]Nir 1983□70□

[22]Hooke□□□Monastersky 1994□Ryabchikov 1975□142[illegible]3000[illegible]1000[illegible]

[23]1950—1990[illegible]“□□”[illegible]Arnold et al.1990□77□□

[24]Meade et al.1990□266[illegible]1909[illegible]8□□

[25]Dupon 1986□Winslow 1993□□□1994[illegible]GNP□1/4□US Department of the Interior 1995□587□□

[26]Hyndman 1994[illegible]Fly River[illegible]tailing[illegible]Jaba River[illegible]20□□80[illegible]1975[illegible]

[27][illegible]Bingham Canyon□□Goudie 1985□□Ripley et al.1996[illegible]Young 1996□105–30[illegible]

[28][illegible]Alexander 1993□230□Judson 1968□373□Lal and Pierce 1991a□2[illegible]·□□□Tim Beach□□□□60%□80%[illegible]

[29]Meade et al.1990□

[30]□□Dregne 1982□□□□□Butzer 1975□

[31][illegible]Fang and Xie 1994□□Ren and Walker 1998[illegible]Menzies 1996□556–8[illegible]

[32]Wen 1993□73–5□Ren and Zhu 1994□□□1855[illegible]50□□□1970[illegible]Milliman et al.1987□□□□Lal 1990□145[illegible]50%[illegible]

[33]Smith and Baillie 1985[illegible]Heine 1983□

[34]□1910[illegible]1/8[illegible]1/6□1/10[illegible]1870—1920□□□□□10%□15%[illegible]60%□65%□Conzen 1990□□

[35]Butzer 1975□70□

[36]Jacks and Whyte 1939□21[illegible]·□□□Elspeth Huxley[illegible]Economist,18 January 1997□86□□

[37]Anderson 1984□Beinart 1984□Khan 1997,SADCC 1987□Showers 1989□Stocking 1985□Whitlow 1988[illegible]Pletcher 1991[illegible]Jacks and Whyte 1939□247□“[illegible]”[illegible]Campbell 1991□

[38][illegible]

□□□□□□□

[39]□□□Jones 1987□30□

[40]Anderson 1975□Jones 1987□Stark 1987□□□□□□□□□□Worster 1979□20□□50□60□□□□□□□□□□□□□□□□□□□□□□□□□□19□□90□□□□□□□□□□□□□□□□□□□□

[41]Jacks and Whyte 1939□213□□□□□□□□□□□□□□□Bahre 1979□76–7□□□□□□□□Barker and McGregor 1988□□□□□□□□□Barrett 1997□ch.3□□□□□□□□□□Beach 1994□□□□□□□□□Molina Buck 1993□□□□□□□□□□□Wilson and Ryan 1988□□□□□□□□□

[42]□□□□□□□□□□□□Dregne 1982□12□

[43]Argabright et al.1996□

[44]□□□□□□□□□□□□□Dregne 1982□Grove 1990□Helms 1992□Reij et al.1996□Wen 1993□Lal 1990□132□Opie 1993□9□Pimentel 1993□4□□□□□□□□□□□□□□□□□□□□□

[45]Foweraker 1981□McNeill 1988□

[46]De Bevoise 1995□Kummer 1991□41,1994□Lewis 1992□174–6,182–4□□□10□□□

[47]Bart 1993□23□

[48]Ibid.339–45□Derenne 1988□□□□□□□□□□□□□□□□□□□□□□□□□□□□□Tutsi□□□"□□□□"□revenge fertility□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□1959□□

[49]Moore 1979□Ondiege 1996□Tiffen et al.1994□□1974□□□□□□□□□□□□□□□□□□□□□□□□

[50]□Blaikie 1985□177–9□Lal 1990□133–41□Roberts 1989□168–69□□□□□□□□□□Grepperud 1996□□□□□□□□Ives and Messerli 1989□□□□□□McCreery 1989□□□□□□Zimmerer 1993□□□□□□□□□Randrianarijaona 1983□□□□□□□□

[51]Cruse and Gupta 1991□Raghavan et al.1990□

[52]Craswell 1993□268–9□Daniels 1987b□Hillel 1991□135–40□Young 1996□58–63□□1960□□36%□□□□□□□□□□□□□□□□10%□25%□

[53]Pimentel et al.1993□280□

[54]Lal 1990□130□

[55]Ibid.145–6□

[56]NRC 1993a□221–2□Pimentel and Heichel 1991□115□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

[57]Pimentel et al.1995□

[58]Solbrig and Solbrig 1994□231□□□

[59]Judson 1968□371□Lal and Pierce 1991a□2□□□□□2.6□□□□□□□□□□□□□□□□□□□

[60]Judson 1968□373□

[61]1900□□□□□Shaler 1905□139□

[illegible]2[illegible] [illegible]

“[illegible]”

[illegible]——[illegible]20[illegible]

[illegible]20[illegible]20[illegible]1900[illegible][1][illegible]20[illegible]

[illegible]

[illegible][2][illegible]100[illegible]5000[illegible]0.0003%[illegible]78%[illegible]21%[illegible]

[illegible]10[illegible]

[illegible][3]

[illegible]5000[illegible]

1.[illegible]360ppm[illegible]ppm[illegible]“[illegible]”[illegible]33[illegible]

2.[illegible]1[illegible]15/10[illegible]ppb[illegible]1/10[illegible]500[illegible]1000ppb[illegible]

3.[illegible]50ppb[illegible]

[illegible]CFC[illegible]2.1[illegible]

[illegible]2.1 20[illegible]

气体	人为来源	对人类的重要性	人为排放（%）[a]	1900 年浓度（ppb）	1990 年浓度（ppb）
具有全球重要性[b]					
二氧化碳	燃烧化石燃料；砍伐森林	温室气体	≈ 100	290000	350000
甲烷	稻田、牲畜、垃圾、化石燃料、采矿	温室气体	≈ 60	900	1700

续表

气体	人为来源	对人类的重要性	人为排放（%）[a]	1900年浓度（ppb）	1990年浓度（ppb）
氯氟碳化合物	冷冻剂、喷雾剂	破坏臭氧层、温室气体	100	0	≈ 3
氧化亚氮	肥料、燃烧生质燃料、砍伐森林	温室气体、破坏臭氧层	≈ 25	285	310
具有地方性或区域性重要性					
二氧化硫	燃烧化石燃料、矿砂冶炼	酸雨	≈ 65	?	0.3-50
氧化氮	燃烧化石燃料或生物量燃料	酸雨、烟雾	≈ 65	?	0.001 ~ 50
臭氧（对流层）	汽车废气与阳光相互作用	温室气体、烟雾	50 ~ 70	10[c]	20 ~ 40[c]

□□□□Graedel and Crutzen 1989□Salstein 1995

□a□□□□□□□□□□□□□1900□□□□□□□□□□□□□□□□□□□□

□b□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□“□□□□”□□□□□□
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□c□□□□□□□□□□□□□□□□□

□20□□
□□□

[illegible]2.2[illegible]1920[illegible]20[illegible]30[illegible]1980[illegible][4]

[illegible]2.2 1850—1990[illegible]

年平均量（单位：吨）					
年份	镉	铜	铅	镍	锌
1850—1900	380	1800	22000	240	17000
1901—1910	900	5300	47000	800	39000
1911—1920	1100	8000	49000	2100	49000
1921—1930	1400	9600	110000	2100	62000
1931—1940	1700	12000	170000	4900	75000
1941—1950	2200	17000	170000	8000	96000
1951—1960	3400	23000	270000	14000	150000
1961—1970	5400	44000	370000	26000	240000
1971—1980	7400	59000	430000	42000	330000
1981—1990	5900	47000	340000	33000	260000

[illegible]Nriagu 1994

1900[illegible]

[illegible] 50 [illegible]

[illegible] [5] [illegible]

[illegible] Hermopolis [illegible] Nubia [illegible] [6] [illegible] Horace [illegible] [7] [illegible]

[illegible] [8] [illegible] ice core [illegible] 10 [illegible] 960—1279 [illegible] 15% [illegible] 1 [illegible] 20 [illegible] 90 [illegible] 1/10 [illegible] 2500 [illegible] 1875 [illegible] [9] [illegible] 1000 [illegible] Maimonides [illegible] 1135—1204 [illegible] Córdoba [illegible] “[illegible]” [illegible] “[illegible]” [illegible] [10]

[illegible] [11] [illegible] [12] [illegible]

[illegible] 13 [illegible] 16 [illegible] 17 [illegible]

[illegible]——[illegible][13]

[illegible]

[illegible]

[illegible][14]

[illegible]·[illegible]Robert Southey[illegible]1808[illegible]“[illegible]”[illegible][15]

1780[illegible]1870[illegible]10[illegible][16][illegible]“[illegible]”[illegible]Black Country[illegible]Swansea[illegible]1/4[illegible]20[illegible]90[illegible]4[illegible]7[illegible][17]

1900[illegible]

20[illegible]1900[illegible]20[illegible]60[illegible]1990[illegible]“[illegible]”[illegible][18][illegible]

[illegible]19[illegible]1800—1920[illegible]20[illegible]10[illegible]20[illegible][19]

[20]

W.P.Rend 1892 “

” [21]

[22]

1920

1929

1946—1948 1948 1970

1950

20 60 70

1978 1980

[23]

1850 1890 [24]

20

1921 [25]

20 20

1950 1950—1975

1960 1997 200

1910 100 1930 5000 1955 1 1985

5 1995 7.77 [26]

1950—1990 4 1.9 20 70

[27]

5% [28]

20[illegible]1945—1980[illegible]

[illegible]1920[illegible]1910[illegible]1950[illegible]1945—1973[illegible]

[illegible]20[illegible]40[illegible]1940[illegible]1966[illegible]1970[illegible]1980[illegible]1990[illegible]

[illegible]Ruhr[illegible]1960[illegible]“[illegible]”[illegible]greenfield[illegible][29][illegible]

[illegible]1921[illegible]·[illegible]Thomas Midgley[illegible]3[illegible]“[illegible]”[illegible]Dayton[illegible]25[illegible]6[illegible]1/3[illegible]1920[illegible]DuPont[illegible]tetraethyl lead[illegible]20[illegible]70[illegible]1967[illegible][30]1970[illegible]1975[illegible]1972[illegible]1987[illegible][31][illegible]20[illegible]70[illegible]20[illegible]80[illegible]20[illegible]90[illegible]

1977—1994[illegible]95%[illegible]20[illegible]80[illegible]

[illegible]20[illegible]90[illegible][32][illegible]

1945[illegible]1975[illegible]1920—1970[illegible]1970[illegible]20[illegible]1950[illegible]1990[illegible]70%[illegible]95%[illegible]20[illegible]1/8[illegible][33]

[illegible]20[illegible]90[illegible]1900[illegible]5[illegible][34][illegible]20[illegible]60[illegible]20[illegible]40[illegible]1950[illegible]1970[illegible]20[illegible]2.3[illegible]

[illegible]2.3 20[illegible]1900—1990[illegible]

污染物	影响地区	增加率	数据源
铜	全球	5	1
铅	全球	7	1
锌	全球	5	1
氧化氮	美国	9	2
氧化氮	全球	14	3
挥发性有机化合物	美国	2.7	2
二氧化硫	美国	2.2	2
二氧化硫	欧洲	2	4
二氧化硫	承德（中国北部）	10	5
二氧化硫	全球	5	6
臭氧[a]	欧洲	5	4
甲烷	全球	3.5	7

□□□□□1□Nriagu 1996□□2□USEPA 1995□□3□Smil 1990□□4□Graedel and Crutzen 1990□□5□Jiang 1996□□6□Husar and Husar 1990□RIVM 1997□UNEP 1997□225□□□7□Stern and Kaufman 1996

□a□□□□□□□□Graedel and Crutzen 1989□□1890—1989□□□□□□2□4□□

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2. 现代空气污染史的主要都市及熔炉分布图


EUSTON
CHARING CROSS
VAUXHALL
CLAPHAM JUNCTION
WIMBLEDON
77A
RAYNES PARK
77A
NEWS
THEATRE
TRAVEL

[illegible]13[illegible]1952[illegible]12[illegible]4—10[illegible]4000[illegible]the Strand[illegible]

[illegible] [illegible]1900[illegible]660[illegible]1870—1900[illegible]1873[illegible]1879—1880[illegible]3000[illegible]1892—1948[illegible]1909[illegible]1063[illegible]1930[illegible]70[illegible]100[illegible][36][illegible]1950[illegible]1950[illegible]1945[illegible]·[illegible]

1952[illegible]12[illegible]4—10[illegible]4000[illegible]20[illegible]1918[illegible]1956[illegible]*Clean Air Act*[illegible]1956[illegible]1972[illegible]90%[illegible]1962—1988[illegible]20[illegible]60[illegible]20[illegible]50[illegible][37]

[illegible] 1850—1900[illegible]bituminous coal[illegible]1868[illegible]1940[illegible]1861[illegible]·[illegible]·[illegible]Rebecca Harding Davis[illegible]*Life in the IronMills*[illegible]

> [illegible][38]

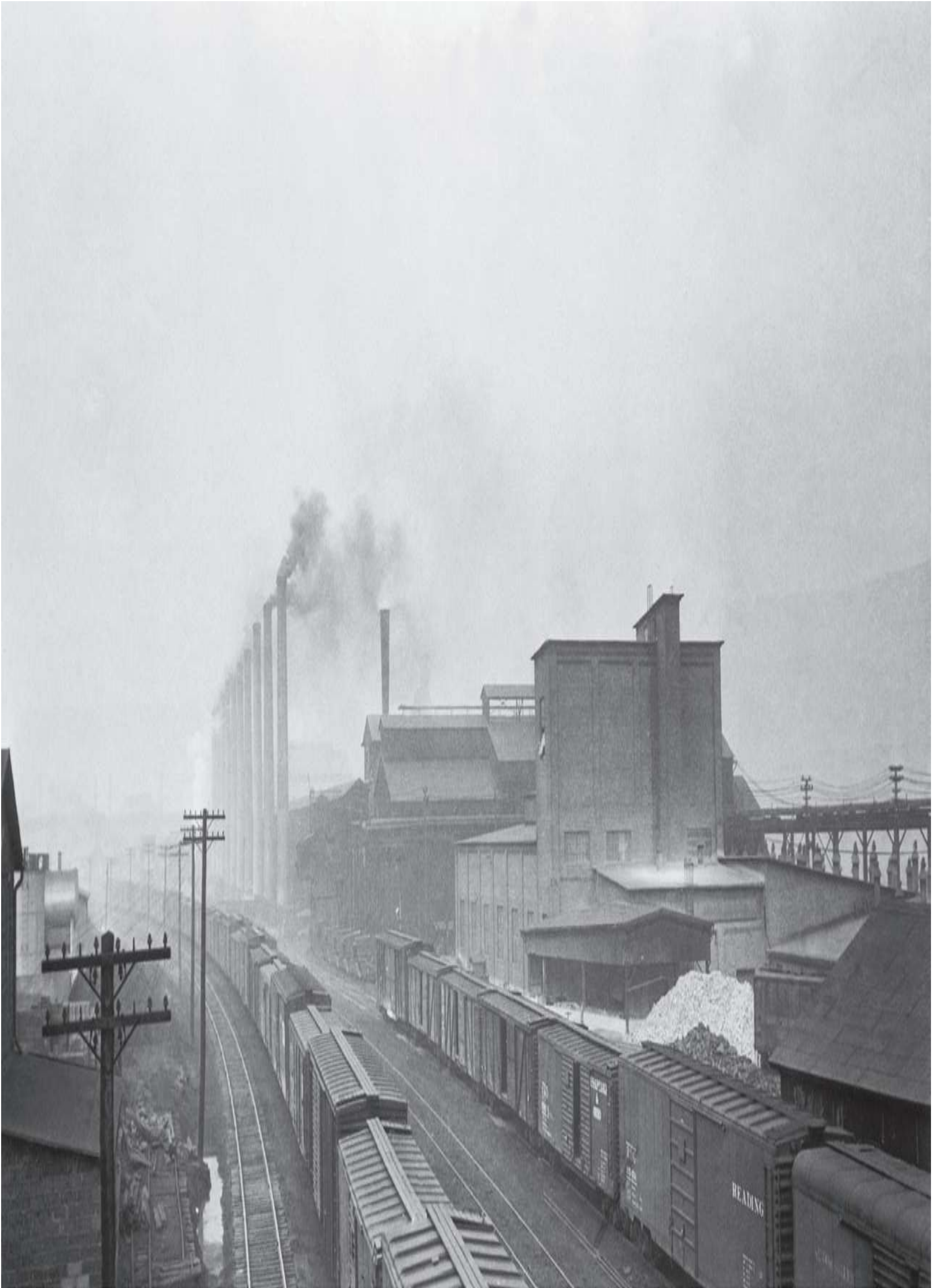
[illegible]Wheeling[illegible]1919[illegible]·[illegible]Waldo Frank[illegible]“[illegible]”[39][illegible]

[illegible]1758[illegible]1865[illegible]Allegheny[illegible]1866[illegible]10[illegible]“[illegible]”[illegible][40][illegible]1884[illegible]30[illegible]300[illegible]5%[illegible]1887—1891[illegible]·[illegible]Andrew Carnegie[illegible]1898[illegible]19[illegible]90[illegible]20[illegible]40[illegible]



[illegible]·[illegible]1905[illegible]

[illegible]1940[illegible]1941[illegible]1940[illegible][41]1941[illegible]1946[illegible]1947[illegible]1953[illegible]1887[illegible]1891[illegible][42]20[illegible]50[illegible]60[illegible]20[illegible]70[illegible]1985[illegible]


READING

1948[illegible]10[illegible]Donora[illegible]20[illegible]
[illegible]1956[illegible]“[illegible]”[illegible]
[illegible]20[illegible]50[illegible]



[illegible]1949[illegible]1970[illegible]

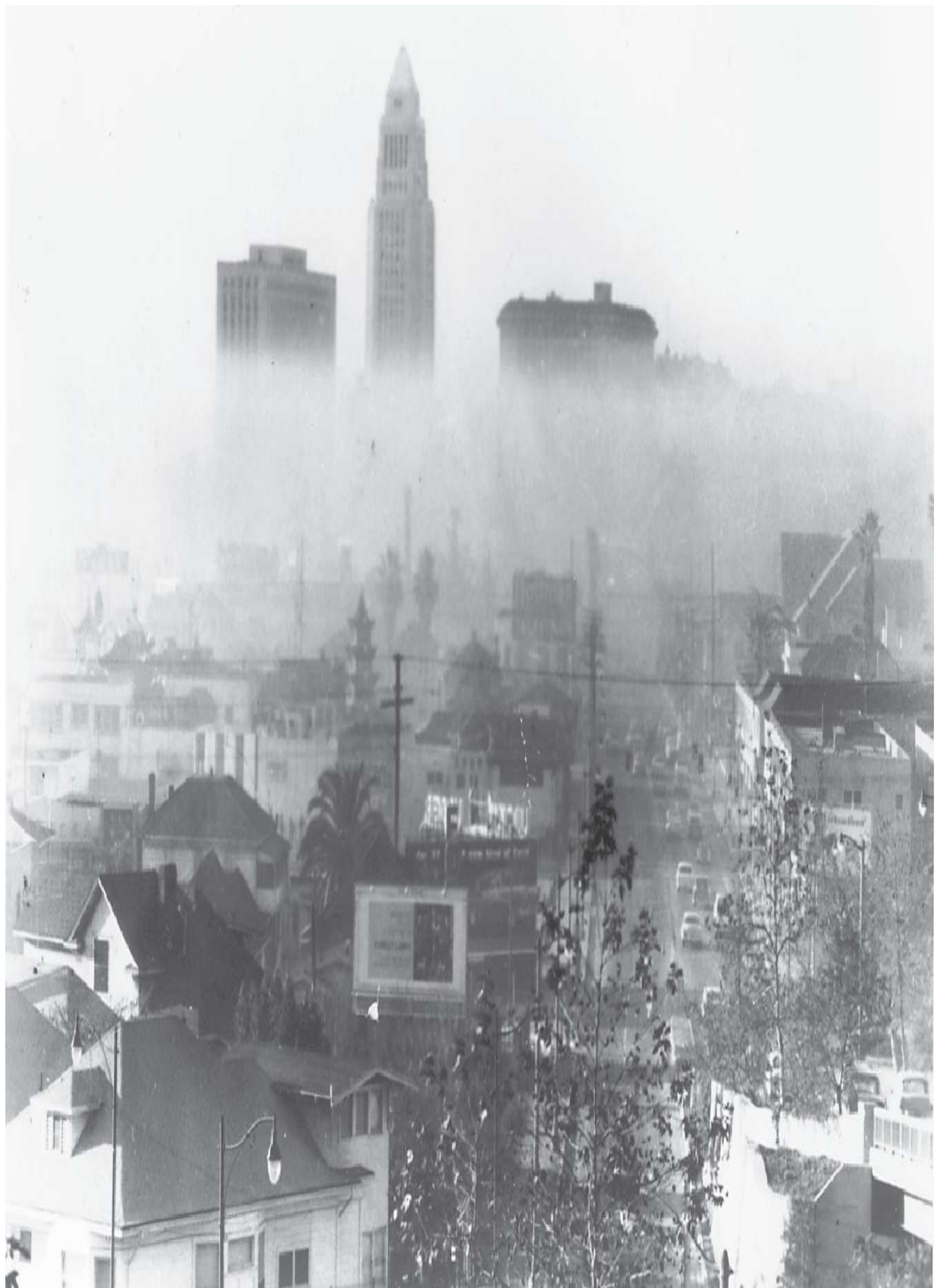
[illegible]1900[illegible]1930[illegible]——[illegible]1940[illegible]1950[illegible][43]

[illegible]

“[illegible]”[illegible]Smog[illegible]1905[illegible]smoke[illegible]fog[illegible]

[illegible]

[illegible] [illegible]photochemical smog[illegible]20[illegible]40[illegible]·[illegible]Raymond Chandler[illegible][44][illegible]



[illegible]1966[illegible]400[illegible]
[illegible]20[illegible]60[illegible]
[illegible]

[illegible]thermal inversion[illegible][45][illegible]1900[illegible]10[illegible]1930[illegible]140[illegible]1960[illegible]600[illegible][46][illegible]1920[illegible]20[illegible]40[illegible]1950—1990[illegible]4[illegible]1100[illegible]

[illegible]20[illegible]40[illegible]·[illegible]Raymond Tucker[illegible]1947[illegible]60[illegible]80[illegible]50[illegible]20[illegible]70[illegible]1976[illegible]20[illegible]90[illegible][47]

[illegible]2500[illegible]to nephos[illegible]“[illegible]”[illegible]

1834[illegible]1830—1920[illegible]1.5[illegible]50[illegible]Anatolia[illegible]20[illegible]60[illegible]200[illegible]1980[illegible]300[illegible]1/3[illegible]

[illegible]Piraeus[illegible]1960[illegible]1950[illegible][48]

[illegible]1920[illegible]1931[illegible]1940—1949[illegible]lignite[illegible][49][illegible]1965[illegible]

1955[illegible]1997[illegible]1965[illegible]1983[illegible][50][illegible]1975[illegible]20[illegible]90[illegible]

[illegible]20[illegible]30[illegible][51][illegible]“to nephos”[illegible]20[illegible]70[illegible]1977[illegible]1975[illegible]1987[illegible]2000[illegible]20[illegible]80[illegible]1900—1940[illegible][52][illegible]

To nephos[illegible]1981[illegible]PASOK[illegible]1982[illegible]1983[illegible]1983[illegible][53][illegible]20[illegible]90[illegible][54][illegible]20[illegible]90[illegible]2[illegible]6[illegible][55]

[illegible]

[illegible]

1950[illegible]1950[illegible]1997[illegible]20[illegible]

[illegible] [illegible]1325[illegible]Tenochtitlán[illegible][56][illegible]11[illegible]5[illegible]50%[illegible]80%[illegible]2200[illegible]

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□Alexander von Humboldt□□□□□□□□□□□□□□□□□□□□□□
[57]1900□□□□□35□□□□□□□□□□□2.4□□20□□□□□□□6□□

□2.4 □□□□□1900—1997□□

年份	人口（单位：万）
1900	35
1920	47
1940	180
1960	520
1980	1400
1997	≈ 2000

□□□Ezcurra 1990b□Mitchell 1993a

□□□□□□□□1930□□□□□□□□7%□□1980□□□30%□□□
□□□□□□□□□□□□□□1910—1920□□□□□□□□□□□□□□1990□
□□□□3□□□□□4000□□□□□□□□□□□□□□[58]

□□□□□□□□□□□□□□1950□□10□□□□□1980□□200□□
1994□□□□400□□20□□80□□□□□□□□□□□85%□□□□□□□□□
2/3□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□
□1/10□□□□□□1/20□

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□□□□□□□□□□□□□WHO□□□□□1□4□□□□□“□□”□□10□15□□

[59]20□□80□□□□□□□□□□□□□□□□□□□□□□□□□□□□□1975—1990□□□□□□□□□□□□□□□□□□□□□2□□□□□3□□6□□[60]□1965—1985□□□□□□□□□□□□□□□□□□5□□□□1986□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

□□□□□□□□□□□□□□□□□□□□□[61]□□20□□60□□□□□□□□□□□□□□□□□□1993□□□□□□□□1/3□□□□□□1985□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□Zócalo□□□□□□□□□□[62]

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□□1990□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□1990□□□1991—1995□□□□□□□□□□□□[63]□□

□□□□ □□□□□□□□□□□□□□□□□□□□□□□□□□[64]□□19□□□□□□□□□□□□□□□□□□□□20□□□□□□□□□□□□□□□□□□□□1997□□1500□□□□□□□□□□□□□□□□□□□□□1903□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

□□□□□□□1900□□100□□□□□1950□□□500□□□1980□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□1947—1948□□□□□□□1970—1971□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□1880□□□20□□40□□□□□□□□□□□□□□□□□□□□□□□□□

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[illegible]1863[illegible]Lord Curzon[illegible]1859—1925[illegible]1903[illegible]“[illegible]”[illegible][65][illegible]1906[illegible]1912[illegible]90%[illegible]20[illegible]20[illegible]

“[illegible]”[66][illegible]1911[illegible]

[illegible]20[illegible]20[illegible]1950[illegible]20[illegible]70[illegible]25%[illegible]20[illegible]70[illegible]3[illegible]10[illegible]1975[illegible]20[illegible]80[illegible]2/3[illegible]1990[illegible]200[illegible]

[illegible]1980[illegible]1980[illegible]6[illegible]1992[illegible]50[illegible]1991[illegible]

[illegible]1970[illegible]20[illegible]90[illegible][67]

[illegible]

[illegible]

[illegible] 20[illegible]20[illegible]3[illegible]1920[illegible]1980[illegible]20[illegible]60[illegible]1970[illegible]100[illegible]1973[illegible]1990[illegible]400[illegible]50[illegible]20[illegible]90[illegible][68]

[illegible] Serra do Mar[illegible]Cubatão[illegible]São Paulo[illegible]Santos[illegible]1950[illegible]20[illegible]60[illegible]70[illegible]1980[illegible]10[illegible]40%[illegible]7%[illegible]“[illegible]”[illegible]10[illegible]35%[illegible]1980[illegible]“[illegible]”[illegible][69][illegible]Villa Parisi[illegible]1986[illegible][70][illegible]

[illegible]1964—1985[illegible]1984[illegible]1987[illegible]20%[illegible]30%[illegible]20[illegible]90[illegible][71]

[illegible]20[illegible]30[illegible]

[illegible]

[illegible]1950[illegible]1998[illegible]18[illegible]10[illegible][72][illegible]Caracas[illegible]

[1][illegible]“[illegible]”[illegible]

[2]Turco 1997[illegible]

[3][illegible]10[illegible]10[illegible]45[illegible]Salstein 1995[illegible]

[4]Nriagu 1994.

[5][illegible]Brimblecombe 1995[illegible]1982[illegible]

[6][illegible]734[illegible]King Piankhy[illegible]M.Lichtheim,Ancient Egyptian Literature.III.The Late Period[illegible]Berkeley[illegible]University of California Press,1980[illegible]cited in Brimblecombe 1995[illegible]

[7]Mamane 1987.

[8][illegible]Weeber 1990[illegible]

[9]Hong et al.1996[illegible]Gorres et al.1995[illegible]Nriagu 1990a and 1996[illegible]

[10]Turco 1997[illegible]137[illegible]

[11][illegible]Sumava Mountains[illegible]1640[illegible]Veseley et al.1993[illegible]11[illegible]Hartwell 1967[illegible]

[12]Hartwell 1967[illegible]500[illegible]11[illegible]1126[illegible]13[illegible]

[13]John Evelyn,Fumiugium[illegible]1661[illegible]Brimblecombe 1987[illegible]47–8[illegible]

[14][illegible]Peter Bell the Third,pt.2,stanza 1[illegible]

[15]Grimmett and Currie 1991[illegible]5[illegible]

[16]Clapp 1994[illegible]20[illegible]1[illegible]2%[illegible]4%[illegible]

[17]Clapp 1994[illegible]64–68[illegible]1/5[illegible]“[illegible]”[illegible]68[illegible]1840—1900[illegible]140[illegible]10%[illegible]80[illegible]Mitchell 1978[illegible]1840—1900[illegible]2800[illegible]20[illegible]90[illegible]Hall 1995[illegible]Murray and Lopez 1996,summary[illegible]28[illegible]

[18]Walsh 1990[illegible]217[illegible]WRI 1996[illegible]86[illegible]

[19]1911[illegible]U.S.Geological Survey[illegible]5[illegible]Rosen 1995[illegible]354[illegible]Cioc 1998[illegible]

[20][illegible]Stradling 1996[illegible]Platt 1995[illegible]Tarr and Zimring 1997[illegible]Brimblecombe and Bowler 1992[illegible]Morris-Suzuki 1994[illegible]

[21]Rosen 1995[illegible]385–6[illegible]

[22]Tsuru 1989[illegible]19.

[23]Fang and Chen 1996□Srinanda 1984.

[24]Locke and Bertine 1986□□□1850□□□□□□□□□□□□□□□□□□1890□□□□□□□□□□□□□□□□1890□□□□□□□□□□□□□□□□□

[25]□□□□□□□□□□□□□□□□□□□□□□1980□□□□□□2/3□□□□□□□□□□□□□□□□□□47%□□□□□□□39%□20□□80□□□□□13%□□□□□□□□□□Walsh 1990□217–8□□

[26]□□□□□□Walsh 1990□1995□□□□□□□□□□□22 June 1996□

[27]□□□□□□□□□□OECD□□□□□□□1970□□1990□□□□□□□□□7□□□□□□□□□□□□□□10%□OECD 1995□40,46□□

[28]□□□□□□□□□Living with the Car□□□□22 June 1996□

[29]□□□□□□□□□1000□□

[30]Thomas 1995□305.

[31]1949—1970□□□□□□□□□□□□□□□□□□□□1000□□Satake et al.1996□□

[32]□□□□□□□□□□□□□“□□□□□□□□□□□□□□□□□□□□□□□□□□”□□□Nriagu 1990a,1990b□Rosner and Markowitz 1985□□□USEPA 1995□□□□□□□□Shen et al.1996□□□□Nriagu,et al.1996a□1996b□□□□□□□□□□□□□□□□□□□□□□□□□□□1990□□□□□□□□□□□□□□□□□□□□1820□□□□□□□Tolba and El-Kholy 1992□17□□□1948—1968□□□□□□□□□□□□□□□□□□□□80%□

[33]□□□□□□□□□MacDonald et al.1993□

[34]□□□□□□□□□□□□□□1□□□□□□□□□□□□□□□□□1970□□□□□□□□□□□□□□□□□□□□□□2□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

[35]□□□□□□Brimblecombe 1987□Eggleston et al.1992□Stradling and Thorsheim 1999□□□□□□Davidson 1979 and Tarr 1996□

[36]Zirnstein 1994□307.

[37]1991□□□□□□□□□□□□□□□□□□12□□□□□□□□□□□□□10%□□□□□□□17 September 1994□91□□

[38]Jean Pfaelzer,ed.,1995,A Rebecca Harding Davis Reader□Pittsburgh□University of Pittsburgh Press□□3.

[39]Our America□117□Cronon 1991□12□□□□19□□□□□□□□□□□□□□□□□□“□□□□□□”□Cronon 1991□392□□□□

[40]James Parton□Davidson 1979□1037□□□

[41]□□□□□□Tarr and Zimring 1997□□□□□□□□□□□□□□□□□20□□40□□□□□□□□□□□□□□□□□

[42]□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□30□□□□□□□Donora□□□□□□□□□□□□1948□10□□□□□□□□□□□□□□□□□□□□□□□□□□□□20□□□□6000□□□□□□□□□□1.3□□□□□Snyder 1994□

[43]Eggleston et al.1992□Powell and Wharton 1982□Schulze 1993□Stern 1982□□□□□□Herz 1989□□□□□□Belfast□□□□□□□20□□90□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

[44]Brimblecombe 1995.

[45]□□

[46]□□□□□□□□□□□□□□□□□from Mitchell 1993□□

[47]20□□90□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□Lents and Kelly 1993;Levinson 1992□19–26;Turco 1997□148–63;WRI 1996□68–9□□1992□□□□□□□□□□□□□□□□1970□□□□10%□

[48]□□□□□□□□□□□□□Sorocos 1985 and Leontidou 1990□

[49]Pelekasi and Skourtos 1992□24□1997□□□

[50]□□□□□□□□□□□□□Pattas et al.1994□Katsoulis 1996□□□2□□3/4□□□□□20□□□□□□□1990—1997□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

[51]Papaioanniou 1967□□□□□□□□□□□□□□□□□Klidonas 1993□85–6□□□1931—1984□□□□□□□□□□□□□□

[52]Cartalis and Varotsos 1994.

[53]□□□□□□□□□□□□□□Pelekasi and Skourtos 1992□90–122□□Dede 1993□□□□□□□□□□□□□□□□□□□□

[54]Klidonas 1993□92–4.

[55]Mantis and Repapis 1992□Sifakis 1991□□□Moussiopulos et al.1995□□□□□□□Atmospheric Environment,1995,29□3573–719□10□□□□□□□□□□□□□□□□□□□□□□□□□1986□□□□□Viras et al.1995□□□□□□□□□□□□□□Katsouyanni et al.1990 and Pantazopoulou et al.1995□□□□□□□1975—1982□□□□□□□□□□□□□□

[56]□□□□□Ezcurra 1990a□1990b□Ezcurra and Mazari-Hiriart 1996□Levinson 1992□27–36□□□WHO/UNEP 1992□155–64□

[57]□□□□□□□□□□□□18□□□□□□□□□□□□□□□□□□Garfias and González 1992□□1923□□□□□□·□□□□Alfonso Reyes□□□□□"□□□□□"□la región más transparente del aire□□1940□□□□□□□□□□□□□□□□□20□□50□□□□□□·□□□□□Carlos Fuentes□□1937—1966□□□□□□□□□□□□15□□□□5□□□□□□□□□□□Vizcaíno Murray 1975□109,119□

[58]Garza Villareal 1985□133–94.

[59]□□□□□□□□□□□□□30□70□□□□□□□□□□□□□900□□□□□□"□□"□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

[60]□□□□□□□□□□60□90□□□□□□□□

[61]□□□□□□□□□□World Resources Institute□□□□20□□90□□□□□□□□□□□□□□□6400□□□□WRI 1996□22□□1990□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□11□□□□□□□□□□GDP□0.2%□WRI 1996□24–5□□□□□□□□□□□□□□1.25□□□□□□□□□□1100□□

[62]□□□□□□□□□4 March 1993□A1□□□□□□□Pick and Butler 1997□202□□□□□□□□□

[63]1995□□□□□□1/3□□□□□□□□□□□□□□□□□□□□□□□□□Nemecek 1995□Guzman et al.1996□□□20□□90□□□□□□□□Lacy 1993□Restrepo 1992□Simon 1997□77–82□

[64]□□□□□□□□□□Anderson 1995□WHO/UNEP 1992□91–98□Centre for Science and Environment 1982□74–90□

[65]Anderson 1995□313□□□□

[66]Anderson 1995□323.

[67]□□WHO/UNEP 1992□

[68]Türkiye Çevre Sorunlari Vakfi1991□50–58□Levin son 1992□42–48□Tunceland Ungör 1996.

[69]□□Findlay 1988 and Levinson 1992□□□□□□□□□□□

[70]Bohm et al.1989.

[71]Findley 1988□52–68□Klumpp et al.1996□Levinson 1992□37–42□Dean 1995□324–9□□□□□□□□□□□□□□□□□□

[72]Turco 1997□4□1995□□□□□□Dietrich Schwela□□□□11□□□□□□□□□□□□□□WRI 1996□1□□

[illegible]3[illegible] [illegible]

[illegible]

——[illegible]·[illegible]Walt Whitman[illegible]*Song of Myself*[illegible]

[illegible]20[illegible]

1870[illegible]

[illegible]——[illegible]

[illegible]1870—1914[illegible]Rio Tinto[illegible]19[illegible]70[illegible]“[illegible]”[illegible]1888[illegible]45[illegible]1914[illegible][1][illegible]

[illegible]20[illegible]Ilo[illegible]1888[illegible]20[illegible]20[illegible]1972[illegible][2][illegible]1960[illegible]200[illegible][3][illegible]

[illegible] Norilsk [illegible] 1935 [illegible] 20 [illegible] 80 [illegible][4] [illegible] Murmansk [illegible][5]

[illegible] 19 [illegible] Donetsk [illegible] Magnitogorsk [illegible] Katowice [illegible] 1975 [illegible] 20 [illegible] “[illegible]” [illegible]

[illegible][6] [illegible] 1500 [illegible] Emscher [illegible] 1850 [illegible] 1910 [illegible] 1.1 [illegible] 40 [illegible] Krupp [illegible] Thyssen [illegible][7] 1900 [illegible]

1923 [illegible] 1923 [illegible] 1923 [illegible]



Duisburg 1952 1961 1980

20 20 1929 Solingen 18 1880 1930 1944—1945 1945—1948 20 50

1961 · Willy Brandt 20 60 1966—1969 20 80

20 60 30 20 90 1948

Krakow Tatra 1796 Gleiwitz 1900

19 20 20 1931—1938 1939 1944—1945

[illegible]1948[illegible]20[illegible]80[illegible]1950—1970[illegible]

3. 空气污染区域：鲁尔区与硫污染三角带

□□20□□70□□[8]□□□□□□□3/4□□□□□□□□□□□□□□□2/3□□20□□70□□□□□2/3

[illegible]Upper Silesia[illegible]3%[illegible][9][illegible]20[illegible]70[illegible]6‰[illegible]7‰[illegible][10]

1970[illegible]20[illegible]80[illegible]1990[illegible]5[illegible]

[illegible]1950—1970[illegible]“[illegible]”[illegible]1989—1991[illegible]

[illegible]20[illegible]90[illegible]1989—1991[illegible]1985—1994[illegible]50%[illegible]Nova Huta[illegible][11]

20[illegible]1970[illegible][12]

[illegible]

[illegible]1970[illegible]

[illegible]19[illegible]70[illegible]20[illegible]60[illegible]20[illegible][13][illegible]1868

[illegible]1965[illegible]“[illegible]”[illegible][14][illegible]1975[illegible]1985[illegible]

1885—1925[illegible] [illegible]1890—1905[illegible]4[illegible]17[illegible]1885[illegible]40[illegible]1910[illegible]40[illegible]1925[illegible]48[illegible]1905[illegible]1914—1915[illegible]155[illegible][15]

[illegible]“[illegible]”[16][illegible]

1890—1970[illegible] [illegible]1880[illegible]19[illegible]80[illegible]62[illegible]1900[illegible]1904—1905[illegible]——[illegible]1912[illegible][17]


4. 日本空气污染史的
主要分布图
北海道
日本海
本州岛
东京
横滨
京都
四日市
神户
大阪
大阪湾
宇部
四国
九州岛
太　平　洋
0
50 英里
0
50 千米

[illegible]“[illegible]”[illegible]

[illegible]1925[illegible]20[illegible]20[illegible]20[illegible]20[illegible]240[illegible]1932[illegible]1932[illegible]3.5[illegible]3[illegible]1931[illegible]1932—1934[illegible]1944—1945[illegible]

1945[illegible]1945[illegible]1935[illegible]1/4[illegible]1955[illegible][18]20[illegible]30[illegible]50[illegible]1970[illegible]1970[illegible]1901[illegible]1961[illegible]27[illegible]19[illegible]1970[illegible][19][illegible]Wirtschaftswunder[illegible]60[illegible]

1965—1985[illegible] [illegible]

[illegible]20[illegible]50[illegible]1954[illegible]1961[illegible]1962[illegible]

[illegible]1962[illegible]20[illegible]60[illegible]1967[illegible]1959[illegible]1972[illegible]20[illegible]60[illegible]

[illegible]20[illegible]60[illegible]1965[illegible]1970[illegible]1975[illegible]

[illegible]1960—1970[illegible]200[illegible]1970[illegible]EPA[illegible]“[illegible]”[illegible][20][illegible]MITI[illegible]1970[illegible]20[illegible]70[illegible]1978[illegible]1968[illegible]10%[illegible][21][illegible]

[illegible]20[illegible]90[illegible]20[illegible]60[illegible]20[illegible]30[illegible][22][illegible]1955[illegible]1975[illegible]1973[illegible]1983[illegible]1973[illegible]1947[illegible]1868[illegible][23]

[illegible]

[illegible]20[illegible]20[illegible][24][illegible]

[illegible]19[illegible]60[illegible]（Henrik Ibsen，1828—1906）[illegible][25][illegible]20[illegible]60[illegible][26][illegible]（Bratislava）[illegible]（critical load）[illegible]10[illegible]1950—1958[illegible]

[illegible]1985[illegible]1994[illegible]15%（1980—1995[illegible]20[illegible]70[illegible][27][illegible]1988[illegible]20[illegible]90[illegible][28]

[illegible]20[illegible]70[illegible]80[illegible]Hires[illegible][29]20[illegible]50[illegible]20[illegible]80[illegible]1975[illegible]15%[illegible]25%[illegible]1980[illegible]

20[illegible]80[illegible]1996[illegible]

[illegible]20[illegible]90[illegible][30]

20[illegible][31]1995[illegible][32][illegible]1875—1910[illegible]1945—1975[illegible]1950[illegible]1994[illegible][33][illegible]

[illegible]1985[illegible]——[illegible]

[illegible]

[illegible]

[illegible] [illegible]20[illegible]1992[illegible]30[illegible]70[illegible]88[illegible][34]1996[illegible]56.8[illegible][35]1997[illegible]40[illegible][36][illegible]1950[illegible]4[illegible]1950—1997[illegible]2000[illegible]3000[illegible]“[illegible]”20[illegible]2500[illegible]4000[illegible]1918—1919[illegible]20[illegible]

[illegible]20[illegible][37]

20[illegible]70[illegible]3[illegible]6[illegible]2%[illegible]3%[illegible][38][illegible]

[illegible]20[illegible]1950—1980[illegible][39][illegible]1973—1988[illegible]9[illegible]

[illegible]20[illegible][40]

[illegible] [illegible]20[illegible]“[illegible]”[illegible]

[illegible]sycamore[illegible]19[illegible]20[illegible]Tashkent[illegible]1970[illegible][41]

[illegible]anthracosis[illegible]silicosis[illegible]1873[illegible]12[illegible]Islington[illegible]selective pressure[illegible]

[illegible]19[illegible]20[illegible]
[illegible]20[illegible][42]

[illegible]19[illegible]
20[illegible]1970[illegible]
[illegible]20[illegible]90[illegible]
1/4[illegible][43][illegible]
[illegible]“[illegible]”[illegible]Waldsterben[illegible]
[illegible][44][illegible]
[illegible][45]

[illegible]20[illegible]
[illegible]
1960[illegible]
[illegible]1920[illegible]

[illegible]
[illegible]20[illegible]
[illegible]8[illegible]
[illegible]25[illegible]Acropolis[illegible]2400[illegible]
[illegible]1974[illegible]
[illegible]Piazza
della Signoria[illegible]20[illegible]90[illegible]
[illegible]90[illegible]1970[illegible]
[illegible][46]

[illegible]1980[illegible]
[illegible]Agra[illegible]Tikal[illegible]
[illegible]100[illegible]Giza[illegible]
[illegible]4000[illegible]
[illegible]5[illegible]5[illegible][47][illegible]
[illegible]

[illegible] 20[illegible]
[illegible]1997[illegible]
[illegible]8%[illegible][48][illegible]1970[illegible]

[illegible]1970[illegible]1980[illegible]

[illegible]1970[illegible]20[illegible]10[illegible]1975[illegible][49]

[illegible]

[illegible]20[illegible]21[illegible]20[illegible]20[illegible][50]

[illegible] [illegible][51][illegible]23[illegible]9[illegible]

[illegible]1800[illegible]1000[illegible]270[illegible]290ppm[illegible]1800[illegible]1900[illegible]295ppm[illegible]1950[illegible]310[illegible]315ppm[illegible]1995[illegible]360ppm[illegible]3/4[illegible]1900[illegible]700ppm[illegible]1720ppm[illegible]

[illegible]1800[illegible]2[illegible]20[illegible][52]

[illegible]1890—1990[illegible]0.3[illegible]0.6[illegible]1910—1940[illegible]1975[illegible]1940—1975[illegible]10[illegible]9[illegible]1987—1997[illegible]20[illegible]90[illegible]14[illegible]10[illegible][53][illegible]200[illegible]600[illegible][54]

[illegible]40[illegible]20[illegible]80[illegible]1997[illegible][55][illegible][56][illegible]IPCC[illegible]1995[illegible]20[illegible]80[illegible][57]

20[illegible]10[illegible]25[illegible]20[illegible]21[illegible]

20[illegible]90[illegible]21[illegible]1[illegible]5[illegible]1[illegible]10[illegible][58][illegible][59][illegible]——[illegible]——[illegible]21[illegible][60]

[illegible] [illegible]99%[illegible][61][illegible]10[illegible]

[illegible]1930—1931[illegible]·[illegible]Thomas Midgley,Jr.[illegible]Freon[illegible]

[illegible]1889[illegible]Beaver Falls[illegible]Dayton[illegible]Columbus[illegible]1921[illegible]1923[illegible]ethyl gasoline[illegible]

[illegible]Frigidaire[illegible]1930[illegible]1940[illegible]1944[illegible][62]



[illegible]20[illegible]30[illegible]40[illegible]1950[illegible]2[illegible]1970[illegible]75[illegible]1974[illegible]·[illegible]Sherwood Rowland[illegible]·[illegible]Mario Molina[illegible]1985[illegible]J.C.Farman[illegible][63][illegible]1960—1995[illegible]10%[illegible][64]

[illegible]B[illegible]B[illegible]20[illegible]70[illegible]UNEP[illegible]1985[illegible]1987[illegible]1990[illegible]1992[illegible]1995[illegible]1988[illegible]75%[illegible]100%[illegible]1986—1994[illegible]80%[illegible]

[illegible]2087[illegible]10[illegible]20[illegible]“[illegible]”[illegible]1970[illegible]2070[illegible][65][illegible]10[illegible]50[illegible]

[illegible]“[illegible]”[illegible]25[illegible]100[illegible]200[illegible][66][illegible]1[illegible]2[illegible]“[illegible]”[illegible][67]

20[illegible]

[illegible]20[illegible]12[illegible]20[illegible]

[illegible]

20[illegible]1975[illegible]Sputnik[illegible]near-space[illegible]3[illegible]150[illegible][68]

[illegible]

20[illegible]

[illegible]20[illegible]

[illegible]

[illegible]20[illegible]40[illegible]
[illegible]
1975[illegible]
[illegible]
[illegible]
[illegible]·[illegible]Samuel Johnson[illegible]
[illegible]

[1]Kaplan 1981[illegible]38–47.

[2]Ripley et al.1996[illegible]170–80[illegible]Dudka et al.1995[illegible]381[illegible]1972[illegible]Inco[illegible]1%[illegible]1500[illegible]1974[illegible]Cox 1982[illegible]Quinn 1988[illegible]1930[illegible]Quinn 1989[illegible]

[3]Vizcarra Andreu 1989[illegible]1994[illegible]Murley 1995[illegible]284[illegible]

[4]Peterson 1993[illegible]13[illegible]Lincoln 1994[illegible]403[illegible]

[5][illegible]WRI 1996[illegible]206[illegible]35[illegible]15[illegible]Kotov and Nikitina 1996[illegible]15%[illegible]Gytarsky et al.1995[illegible]3200[illegible]

[6][illegible]Br.ggemeir 1994 and 1990[illegible]Brüggemeir and Rommelspacher 1992[illegible]

[7][illegible]Wilhelmine Germany[illegible]1871—1918[illegible]Gilhaus 1995[illegible]Spelsberg 1984[illegible]

[8][illegible]2/3[illegible]86[illegible]181[illegible]Carter 1993a[illegible]77[illegible]

[9]1990[illegible]1/3[illegible]Carter 1993b[illegible]

[10]Trafas 1991[illegible]Majkowski 1994[illegible]Bobak and Feachem 1995[illegible]20[illegible]80[illegible]3%[illegible]

[11]Carter 1993a and 1993b[illegible]Klarer and Moldan 1997[illegible]Stanners and Bourdeau 1995[illegible]ch.4 et Passim[illegible]Trafas 1991[illegible]Bobak and Feachem 1995[illegible]Moldan 1997[illegible]

[12]Dominick 1998[illegible]

[13][illegible]20[illegible]

[14][illegible]Hashimoto 1989[illegible]

[15][illegible]Okada 1990[illegible]Miura 1975[illegible]286–305[illegible]

[16]Morris-Suzuki 1994[illegible]203[illegible]

[17][illegible]Miura 1975[illegible]244–56[illegible]

[18][illegible]Ibid.37[illegible]

[19][illegible]Hashimoto 1989[illegible]Morris-Suzuki 1994[illegible]202–7[illegible]

[20][illegible]Nishimura 1989[illegible]v[illegible]

[21]Hashimoto 1989[illegible]42.

[22][illegible]Environment,March 1994,36[illegible]36[illegible]75[illegible]90%[illegible]1995[illegible]

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[23]□□□□□□Hashimoto 1989□Morris-Suzuki 1994□□□Tsuru 1989 and 1993□Hoshino 1992□□□□□□□□□□□□□□□□□Krishnan and Tull 1994□Broadbent 1998□

[24]□□□□1980□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□1:1□□□Graedel et al 1995□

[25]Brimblecombe et al.1986.

[26]□□Cooper 1992□□

[27]Murley 1995□387□□□1980—1992□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□75%□□□□□□□□□□□□□□□+27%□□□□□□□□□□

[28]Freemantle 1995□□□□□□□□□□□

[29]Hires□□□□□□□□□4.38□□□□□□3.32□1982□□□□□□□□□□□□□4.2□□□Ponting 1991□366□□□□□□□□□□□□□□□□□□□1.5□□□□□□□□2.4□□□□□□□1.0□□□□

[30]Kotamarthi and Carmichael 1990□20□□90□□Aamlid 1990□Ayers and Yeung 1996□Elder 1992□Hashimoto et al.1994□Mason 1992□Rodhe 1989□□Stanners and Bourdeau 1995□ch.4 and 31□

[31]□□Rodhe et al.1995□Rodhe 1989□□□□□□□□□□□□□□□□□□1995□□□□□□□□□“□□□□□□□”□□□□□□

[32]Freemantle 1995□11–2□□□□□□□□□2.5%□□□□□

[33]□□□□□□□□□4.6□□□□□□□□□□□□□5.5□10□□Rodhe et al.1995□□□□□□□□□7.0□□□□□□□□□□□□□□3□H□□□□□□□□500□□□□□□□□□□□□□□Laj et al.1992□□□Science of the Total Environment□□,1995□160–1□□□□□□□□□□□□□□□□Barrie 1986□Barrie et al.1985□Shaw 1995□1870—1975□□□□□□□□□□□□□□□□□□□□□□□1990□□□□□□□□□□□□□□□□□□□□5□10□□□Husar and Husar 1990□416□□

[34]□□□□□□□WRI 1996□22 and Hall 1995□77□□□□

[35]Murray and Lopez 1996□28□□□□□vol.9□□□□□

[36]□□□□□□□□□1997□4□21□□

[37]□□□□□□□□□□□□□□□□□□□□□□

[38]WRI 1996□64–7□□□□□□□□□□Natural Resources Defense Council□□1996□□□□□□□□□□□□□□6.4□□□□□□□

[39]□□□20□□□□□□□□□□□□□□19□□Weiss et al.1972□Moore 1995□45□□□□□□□□□□□□□□□□□□□□□□□□□□10%□15%□□□□□□□□□□□□□□□□□□□□□□□□□□WRI 1996□47□Williams 1998□□□□□□□□□□□□□□□□□□□□□□□□□17%□□□□□□□□□□90%□

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[41]Gilbert 1991□33–40□□□Greg Maggio□□□□□□□□□□□□□□□□□□□□□□20□□60□□□□□□□□□□□□□□□□□□□□□□□□□□□Lodz□□□□□□□□□□□□□□□□□□□

[42]Fitter 1946□179–184□□□□□□□□□□□□1996□11□12□□C1□C6□□□□□□150□□□□□Lancashire□□□

[43]□□□□□□□□□□□□25%□Stanners and Bourdeau 1995□560□□

[44]□□□□□□□□□□□□□□□□□□□□□□□□□□□□Fuhrer 1990;Kandler and Innes 1995;Olson et al.1992;Kuusela 1994□135–6□□Kuusela□□□□□□□□□□□□□□□□□□□□□□0.5%□□□□□□□□□□□□□□□□□□□□Holland and Petersen 1995□322–3□□□□□□□□□□□□□□□□□□□□□□□□□□30%□60%□□□□□□□□Lonkiewicz et al.1987□1970□□□□20□□□□□□□□□□□□□□□□□1985□□□70□□

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[46]U.N.Economic commission for Europe 1992□53–81□Kucera and Fitz 1995□Matson and Miller 1991□Norwich 1991□Sikiotis and Kirkitsos 1995□Trudgill et al.1990□□□□□Science of the Total Environment□□□1995,167□

[47]Salmon et al.1995□□□□□□□Deshpande et al.1993□□□□□□□Keskinler et al.1994□□□□□□□□□Erzurum□□□□□□□□□□□□□□□□4.2□□□□□□□□□□□□□□□□□□□□□□□□□□

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[49]□□□□□□□□□“□□□□”□□Haas 1990□□

[50]□□□□□□de Gruijl 1995□IPCC 1996□Turco 1997□

[51]□□IPCC 1996 1□15–21□□□□□□□“□□□□□”□radiative forcing□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

[52]IPCC 1996 1□5□□□□“□□□□□□□□□□□□□□□□□□□□□□□□□□□□”□□□□□□□□□□□U.S.Global Change Research Program□1998□14□□□□□□□□□□□“□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□”

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[54]Mann et al.1998□

[55]□□□□□□□□1997□4□17□□

[56]□□Dennis 1996□165□1995□□□□□□□Larsen Ice Shelf□□□200□□□□□□□□□□□□□□□□□□□□□□□□□□

[57]Berz 1990.

[58]2100□□□□□□□□□□□□□□□□1□5□□□□□□□□□□□□□□□□□□□□□□□IPCC 1996□

[59]Rosenzweig and Hillel 1995□

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[62]□□Dictionary of American Biography,supplement 3□New York□Scribner’s,1973□□521–2□

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[64]□1979—1992□□□□□□□□□□□□□45—55□□□□□DNA□□□□□□□□□□4%□9%□□□U.S.Global Change Research Program 1998□37□□□

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[66]NASA 1991□□□□□□2040□□□□□□20□□□□□□□□

[67]De Gruijl 1995□□□□□□□French 1997□

[68]□□□□□□□□Scheraga 1986□□□□□□□□□1997□3□29□□87–8□□□□□□□□□□□□□□□□□□□□□□□□□1997□□□□□□□8649□□□□□□□□□□□□□□□□200□□□□□□□□

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[illegible]Samuel Taylor Coleridge[illegible]*Rime of the Ancient Mariner*[illegible]“[illegible]”[illegible]

[illegible]14[illegible]97%[illegible][1][illegible]50[illegible]69%[illegible]98%[illegible][2][illegible]1%[illegible]9[illegible]1/4[illegible]Lake Baikal[illegible]

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			用途[a]		
年份	用量（立方千米）	人均用量	灌溉（%）	工业（%）	都会（%）
1700	110	0.17	90	2	8

续表

			用途[a]		
年份	用量（立方千米）	人均用量	灌溉（%）	工业（%）	都会（%）
1800	243	0.27	90	3	7
1900	580	0.36	90	6	3
1950	1360	0.54	83	13	4
1970	2590	0.70	72	22	5
1990	4130	0.78	66	24	8
2000[b]	5190	0.87	64	25	9

□□□□□□L’vovich and White 1990□Shiklomanov 1993

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		占全球淡水用量比例（%）[a]		
	河流径流（占全球%）	1900年	1950年	1990年
亚洲	32	71	63	60
欧洲	7	12	13	13
北美	18	10	17	18
非洲	10	5	5	6
南美	26	2	2	4
大洋洲	5	~	1	1
		≈100	≈100	≈100

□□□□□□L’vovich and White 1990□Shiklomanov 1993

□a□□□□□□□□□□□□□□□□□□100%□

□□□□

[illegible]——[illegible]——[illegible]19[illegible]19[illegible]50[illegible]19[illegible]80[illegible]

[illegible]Golden Horn[illegible]1453[illegible]16[illegible]Sinan[illegible]20[illegible]30[illegible]1600[illegible][6]20[illegible]

[illegible]1923[illegible]120[illegible]20[illegible]20[illegible]20[illegible]50[illegible]10%[illegible]20[illegible]60[illegible]70[illegible]1980[illegible]1990[illegible][7][illegible]

[illegible]19[illegible]1848[illegible]3[illegible]1900[illegible]1885—1886[illegible]9[illegible]12%[illegible]1891—1895[illegible]2[illegible]Calumet River[illegible]1900[illegible]Joliet[illegible]“[illegible]”[illegible][8]

5. 水质史主要分布图



华盛顿湖
普捷湾
西雅图
华盛顿湖
荷兰
莱茵河盆地
科隆
波恩
比利时
卢森堡
法国
德国
巴塞尔
菲斯河
塞布河
拉巴特
菲斯
菲斯河
渡良濑川盆地
足尾
渡良濑川
东京
北冰洋
莫诺那湖
密歇根湖
芝加哥
切萨皮克湾
苏黎世湖
波罗的海
黑海
君士坦丁堡
地中海
首尔
黄海
卡拉奇
达喀尔
马德拉斯
墨西哥市
太平洋
亚马孙河
刚果河 /
扎伊尔河
印度洋
大西洋
罗讷河
波河
的里雅斯特
亚得里亚海
黑海
里昂湾
塞萨洛尼基
伊兹密尔
雅典
伊斯肯德伦
突尼斯
地中海
地中海
恒河盆地
恒河
瓦拉纳西
加尔各答
孟加拉湾

[illegible]6[illegible]8[illegible]1930[illegible]1959[illegible]1985[illegible][9][illegible]

[illegible]1850[illegible]1850[illegible]1850[illegible]——[illegible]19[illegible]80[illegible]1908—1910[illegible][10][illegible]20[illegible]90[illegible]150[illegible][11]

[illegible]1920[illegible]1912—1915[illegible][12][illegible]20[illegible]20[illegible]30[illegible]1934[illegible]20[illegible]30[illegible]60[illegible]1945[illegible]1970[illegible]20[illegible]90[illegible][13]

20[illegible]Kampala[illegible]1870[illegible]1911[illegible]Madras[illegible]1940[illegible]1980[illegible]1980[illegible]90%[illegible]1995[illegible]89%[illegible]Dhaka[illegible]82%[illegible]80%[illegible]20%[illegible]14%[illegible][14]

1880[illegible]“[illegible]”[illegible]increasing returns[illegible]

[illegible]

[illegible]

[illegible]Oued Fez[illegible]

[illegible]1/4[illegible][15]1900[illegible]1886[illegible]1896[illegible]·[illegible]“[illegible]”[illegible]“[illegible]”[illegible][16][illegible]1990[illegible]4.5[illegible]7000[illegible]1990[illegible]1900[illegible]20[illegible]5[illegible]10[illegible]

[illegible]Benares[illegible]20[illegible]80[illegible]3000[illegible]6[illegible]20[illegible]60[illegible]20[illegible]60[illegible]1985[illegible]“[illegible]”[illegible]Ganga Action Plan[illegible]1990[illegible][17][illegible]



[illegible] 1985 [illegible]
20 [illegible] 80 [illegible] 3000 [illegible]

[illegible] 19 [illegible] 1866 [illegible] Calder [illegible] Bradford [illegible] 1.8 [illegible][18]

19 [illegible] 20 [illegible] 60 [illegible] 1869 [illegible] “[illegible]” [illegible] River Irwell [illegible] 20 [illegible] 50 [illegible][19] 1972 [illegible][20]

[illegible] 1300 [illegible] 1765 [illegible] 1828 [illegible] *Cologne* [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]150[illegible]1880[illegible]

[illegible]19[illegible]19[illegible]90[illegible]1914[illegible]5[illegible]1931[illegible]

[illegible]1944—1948[illegible]1950—1973[illegible]1980[illegible]20%[illegible]1900—1977[illegible]5[illegible]2[illegible]7[illegible]4[illegible]27[illegible]5[illegible][21][illegible]Alsace[illegible]1880—1960[illegible]6[illegible]1948[illegible]DDT[illegible]PCBs[illegible]1950—1975[illegible]20[illegible]80[illegible]PCBs[illegible]400[illegible][22][illegible]

[illegible]1964[illegible]20[illegible]70[illegible]1975[illegible]1885[illegible]1915[illegible]1976[illegible]Sandoz[illegible]180[illegible]1992[illegible][23]

[illegible] [illegible]1610[illegible]1603—1868[illegible]1877[illegible]1883[illegible]19[illegible]90[illegible]95%[illegible]40%[illegible]

[illegible]1888[illegible]5000[illegible]19[illegible]90[illegible]

[illegible]1897—1898[illegible]1900[illegible]1904—1905[illegible]1907[illegible][24][illegible]450[illegible]1955[illegible]1972[illegible]1974[illegible][25]

[illegible] [illegible][26][illegible]1995[illegible]100[illegible]Sebou River[illegible]10[illegible]1371[illegible]Granada[illegible]·[illegible]·[illegible]Lisanuddin Ibn Al-Khatib[illegible]“[illegible]”

[illegible]13[illegible]Merinid[illegible]1912[illegible]20[illegible]60[illegible]Saïs plain[illegible]1990[illegible]5[illegible]10[illegible]·[illegible]50[illegible]20[illegible]

[illegible]

[illegible]21[illegible]3[illegible]20[illegible]30[illegible]——[illegible]

[illegible]

[illegible]1850[illegible]Lake Mendota[illegible]1850[illegible]algal bloom[illegible]1898[illegible]1930[illegible]1946[illegible]20[illegible]60[illegible]1945[illegible]Lake Erie[illegible]

[illegible]20[illegible]30[illegible]1936[illegible]Puget Sound[illegible]20[illegible]40[illegible]1955[illegible]1963[illegible]

[illegible]20[illegible]60[illegible]70[illegible][27]

[illegible]1860[illegible]1900[illegible]

[illegible]

[illegible]20[illegible][28]

[illegible]20[illegible]50[illegible]Vistula river[illegible]the Po[illegible]20[illegible]60[illegible]

[illegible]1970[illegible]——[illegible]——[illegible][29]

[illegible]1880[illegible]1940[illegible][30][illegible]

[illegible] 1910 [illegible]company town[illegible]1950[illegible]5[illegible]1930[illegible]20[illegible]40[illegible]50[illegible]“[illegible]”[illegible]1956[illegible]“[illegible]”[illegible][31][illegible]1985[illegible]10[illegible][32][illegible]1973[illegible]“[illegible]”[illegible]1977[illegible]1[illegible]1984[illegible]4[illegible]1997[illegible]20[illegible]70[illegible]

[illegible]20[illegible]

[illegible] 1798[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]15[illegible]200[illegible]1950[illegible]1995[illegible]18[illegible][33][illegible]80[illegible]140[illegible]

[illegible]20[illegible]Ostia[illegible]——[illegible]20[illegible]

[illegible]DDT[illegible]PCBs[illegible]radionuclide[illegible]1990[illegible]1/4[illegible]1/3[illegible]20[illegible][34][illegible]

[illegible]20[illegible]20[illegible]30%[illegible]1900[illegible]3[illegible]4[illegible][35][illegible]20[illegible]80[illegible]

[illegible]20[illegible]90[illegible]10%[illegible]

1900[illegible]20[illegible]1948[illegible]20[illegible]70[illegible]1990[illegible]1/4[illegible]1975[illegible]50[illegible]1980—1981[illegible]82[illegible]1/3[illegible]10%[illegible]1980[illegible]1/6[illegible][36]

[illegible]

20[illegible]1929[illegible]5%[illegible]1950[illegible]3%[illegible]1985[illegible]14%[illegible]1960[illegible]1/4[illegible]6%[illegible]7%[illegible]1950[illegible]

[illegible]1990[illegible]9%[illegible]10%[illegible]2/3[illegible]1/10[illegible]1/20[illegible][37][illegible]Ebro[illegible]Rhône[illegible]Trieste[illegible]PCBs[illegible]4.3[illegible]1985[illegible]Golfe du Lyon[illegible]4.3[illegible]

[illegible]4.3 [illegible]1985[illegible]

项目	北部	南部
人口（万）	7300	5000
城市化比率（%）	69	47
有污水处理的城市（%）	70	50
废弃物（百万立方米）	2295	544
注入的氮数量（千吨）	128	48

[illegible]Grenon and Batisse 1989[illegible]245-6

[illegible]Grenon and Batisse[illegible]

[illegible]20[illegible]Thessalonnki[illegible]1990[illegible]1980[illegible]1965[illegible][38]

[illegible]Gulf of Izmir[illegible]Gulf of Iskenderun[illegible]Alexandretta[illegible]1913[illegible][39][illegible]20[illegible]

[illegible]1980[illegible]1978[illegible]Saronic Gulf[illegible]3/4[illegible][40]

[illegible]20[illegible]1872—1988[illegible]15[illegible]1969[illegible]1988[illegible]1969[illegible][41][illegible]Poisidonia oceanica[illegible][42][illegible]

[illegible]20[illegible]90[illegible][43][illegible]1.[illegible]2.[illegible]3.1975[illegible]

1975[illegible] [illegible]20[illegible]70[illegible]1975[illegible]1973[illegible][44][illegible]1980[illegible]——[illegible]——[illegible]

[illegible]1975[illegible]“[illegible]”[illegible]Mediterranean Action Plan[illegible]2000[illegible]“[illegible]”[illegible][45][illegible]1976[illegible]20[illegible]80[illegible]20[illegible][46]

[illegible]

[illegible]1945[illegible]1950[illegible]1992[illegible]60%[illegible]·[illegible]Thor Heyerdahl[illegible]1951—1952[illegible]1969[illegible]18[illegible]57[illegible]40[illegible]Cape Verde[illegible]Barbados[illegible]18[illegible]1970[illegible]——[illegible]——[illegible][47]

[illegible]19[illegible]1970[illegible]1973—1983[illegible]600[illegible]100[illegible]Chesapeake Bay[illegible]1954[illegible]1972[illegible][48][illegible]20[illegible]

[illegible]

[illegible]1945[illegible]1800[illegible]19[illegible]20[illegible]

20[illegible]19[illegible]20[illegible]

[illegible]20[illegible]1948[illegible]

[1] Shiklomanov 1990,1993 Postel 1992

[2]

[3] Rao 1989 1960

[4]

[5] Gleick 1993 396 1998 11 29 U.S.Geological Survey

[6] Orhonlu 1984 78–82 Çeçen 1992 Pinon and Yerasimos 1994.

[7] Özis 1987 Lake Sapanca 20 80

[8] Changnon and Changnon 1996 104.

[9] 1994,2 75–84,101–12 Stout and Ackermann 1987 Changnon 1994 · Peter Campbell Changnon and Changnon 1996

[10] 1829 Poughkeepsie 1879 1800 Goubert 1989 Büschenfeld 1997

[11] Outwater 1996 133–47 Guayacochea de Onofrí1987 Mendoza 20

[12]

[13] Windhoek 20 70 1/3 15th ed.,1976,14 753 Goldman 1972 96–101

[14] GEMS 1989 274 Headrick 1988 145–59 Smil 1984 100 Yeung 1997 Sundaramoorthy et al.1991

[15] Ahmed 1990 Basu 1992 Ghose and Sharma 1989 Varady 1989

[16] Twain 1899,2 192–3

[17] Ghose and Sharma 1989 41–4 Meybeck and Helmer 1989 294 20 80 990

[18] Clapp 1994 74–5

[19] Sherlock 1922 295 1869 Sheail 1997 207 1950 1979 1860 12% Meybeck 1979 241

[20] Ponting 1991 364

[21] Behre et al.1985.

[22] PCBs polychlorinated biphenyl 1929 DDT dichlorodiphenyltrichloroethane 1874 1942 Reihelt 1986 PCBs 11 6 Science News,14 September 1996 165 Joseph Jacobson and Sandra Jacobson

[23] Friedrich and Müller 1984 GEMS 1989 280 Habereer 1991 Lelek 1989 Malle 1996 Meybeck 1979 Reihelt 1986 van der Weijden and Middleburg 1989 Van Urk 1984 140 1974 Wood 1982 118

[24]Nimura 1997[illegible]21.

[25]Hashimoto 1989[illegible]Miura 1975[illegible]259–86[illegible]Notehelfer 1975[illegible]Shoji and Sugai 1992[illegible]Tsuru 1989.

[26][illegible]Kettani 1993[illegible]p.663[illegible]

[27]Barica 1979[illegible]Bonomi et al.1979[illegible]NRC 1992[illegible]188–91[illegible]ReVelle and ReVelle 1992[illegible]395–7[illegible]Schröder 1979[illegible]Edmondson 1991[illegible]

[28]Gorman 1993[illegible]106–7[illegible]1%[illegible]

[29]Elmgren 1989[illegible]Larssen et al.1985[illegible]Linden 1990[illegible]8[illegible]Ambio,1990,19[illegible]3[illegible]

[30]Adler et al.1993[illegible]Alderton 1985.

[31][illegible]20[illegible]30[illegible]40[illegible]50[illegible]1965[illegible]Nishigaki and Harada 1975[illegible]

[32][illegible]1990[illegible]987[illegible]2239[illegible]2903[illegible]Ui 1992b[illegible]131,citing the Japanese Environmental Agency[illegible]

[33]1995[illegible]4[illegible]1.3[illegible]

[34]De Walle et al.1993a[illegible]59.

[35]Stanners and Bourdeau 1995[illegible]495.

[36]De Walle,et al.1993b[illegible]6,62–3[illegible]Le Lourd 1977[illegible]Stanners and Bourdeau 1995[illegible]118[illegible]20[illegible]80[illegible]50[illegible]

[37]Grenon and Batisse 1989[illegible]103–5[illegible]

[38]1982[illegible]Elefsis[illegible]PCBs[illegible]DDT[illegible]20[illegible]15[illegible]18[illegible]Vassilopoulos and Nikopoulou-Tamvakli 1993[illegible]Katsoulis and Tsangaris 1994[illegible]

[39]Tuncer et al.1993[illegible]1985[illegible]Türkiye Çevre Sorunlar1 Vakf1 1991[illegible]216–20[illegible]

[40][illegible]Vassilopoulos and Nikopoulou-Tamvakli 1993[illegible]432[illegible]

[41]Bethoux et al.1990[illegible]Marchetti and Rinaldi 1989[illegible]

[42]Stanners and Bourdeau 1995[illegible]120–1.

[43][illegible]Albaigues et al.1985[illegible]

[44]Molinelli-Cancellieri 1995.

[45]De Walle,et al.1993a[illegible]79.

[46][illegible]Antoine 1993 and Haas 1990[illegible]

[47]Earle 1995[illegible]254–55[illegible]Gorman 1993[illegible]34,39,114.

[48]Prager 1993[illegible]87–131[illegible]Gorman 1993[illegible]69–92[illegible]

[illegible]5[illegible] [illegible]

[illegible]

——[illegible]

[illegible]

——[illegible]·[illegible]Ben Franklin[illegible]*Poor Richard’s Almanac*[illegible]

1908[illegible]Lake Victoria[illegible]Owen Falls[illegible]“[illegible]……[illegible]”[1]

[illegible]1946[illegible]1954[illegible]15[illegible]

[illegible]20[illegible]1850[illegible]symbolic politics[illegible]20[illegible]1900[illegible]

[illegible]

20[illegible]500[illegible][2]

20[illegible]

[illegible]19[illegible]10[illegible]3[illegible]20[illegible]30[illegible]Ogallala Aquifer[illegible]“[illegible]”[illegible][3][illegible]Texas Panhandle[illegible]100[illegible]1[illegible]2.5[illegible]

20[illegible]30[illegible]1945[illegible]20[illegible]50[illegible]70[illegible]1950[illegible]1980[illegible]4[illegible]20[illegible]70[illegible]1/5[illegible]40%[illegible]20[illegible]70[illegible]1%[illegible]10[illegible]·[illegible]Clarence Gigot[illegible]center-pivot[illegible]



6. 水源控制史的主要分布图
1964年后的科罗拉多河盆地
鲍威尔湖
格兰峡谷水坝
科罗拉多河
沙尔顿湖
盐河
希拉河
莫雷洛斯水坝
下加利福尼亚
索诺拉州
波河河谷
阿尔卑斯山脉
科摩湖
马焦雷湖
加达湖
米兰
都灵
波河
费拉拉
巴尔喀什湖
咸海
锡尔河
木伊那克
阿姆河
1960年的咸海盆地
北冰洋
叶尼塞河
鄂毕河
伏尔加河
德涅斯特河
顿河
第聂伯河
底格里斯河
幼发拉底河
库班河
雅鲁藏布江
长江
三峡项目
湄公河
湄南河
伊洛瓦底江
讷尔默达河
密西西比河
俄亥俄河
尼日尔河
太平洋
赞比西河
印度洋
大西洋
拉普拉塔河
亚历山大港
开罗
苏伊士运河
尼罗河
阿斯旺水坝
纳赛尔湖
喀土穆
白尼罗河
青尼罗河
1970年后的
尼罗河及三角洲
奥加拉拉蓄水层
南达科他州
怀俄明州
内布拉斯加州
科罗拉多州
堪萨斯州
落基山脉
俄克拉荷马州
新墨西哥州
得克萨斯州
after Opie 1993
平均年降雨量
少于200毫米
的黎波里
班加西
阿尔及利亚
埃及
深层地下蓄水层
尼日尔
乍得
利比亚大人工河
after Hillel 1994
帝迪普
印度河
巴基斯坦
印度
印度河盆地

[illegible]1974[illegible]1983[illegible]20[illegible]70[illegible]15[illegible]1970[illegible]Sublette[illegible]300[illegible]1980[illegible]70[illegible]1990[illegible]30[illegible]1993[illegible]20[illegible]30[illegible][4]

[illegible]20[illegible]70[illegible]70%[illegible]90%[illegible]1000[illegible]1975[illegible]5[illegible]1984[illegible][5]

[illegible]fossil water[illegible]20[illegible]20[illegible]1951[illegible]40[illegible]1969[illegible]Muammar el-Qaddafi[illegible]Occidental Petroleum[illegible]·[illegible]Armand Hammer[illegible][6][illegible]250[illegible]“[illegible]”[illegible]Great Man-Made River[illegible]5%[illegible]Benghazi[illegible]1986[illegible]4[illegible]10[illegible]1980[illegible][7]

[illegible]Uttar Pradesh[illegible]1970—1985[illegible]2700[illegible]2300[illegible]

[illegible]1985[illegible]1970[illegible]1990[illegible][8]

[illegible]20[illegible]1920—1965[illegible]5[illegible]1961[illegible]Llobregat River[illegible]1965[illegible]1970[illegible][9]

20[illegible]

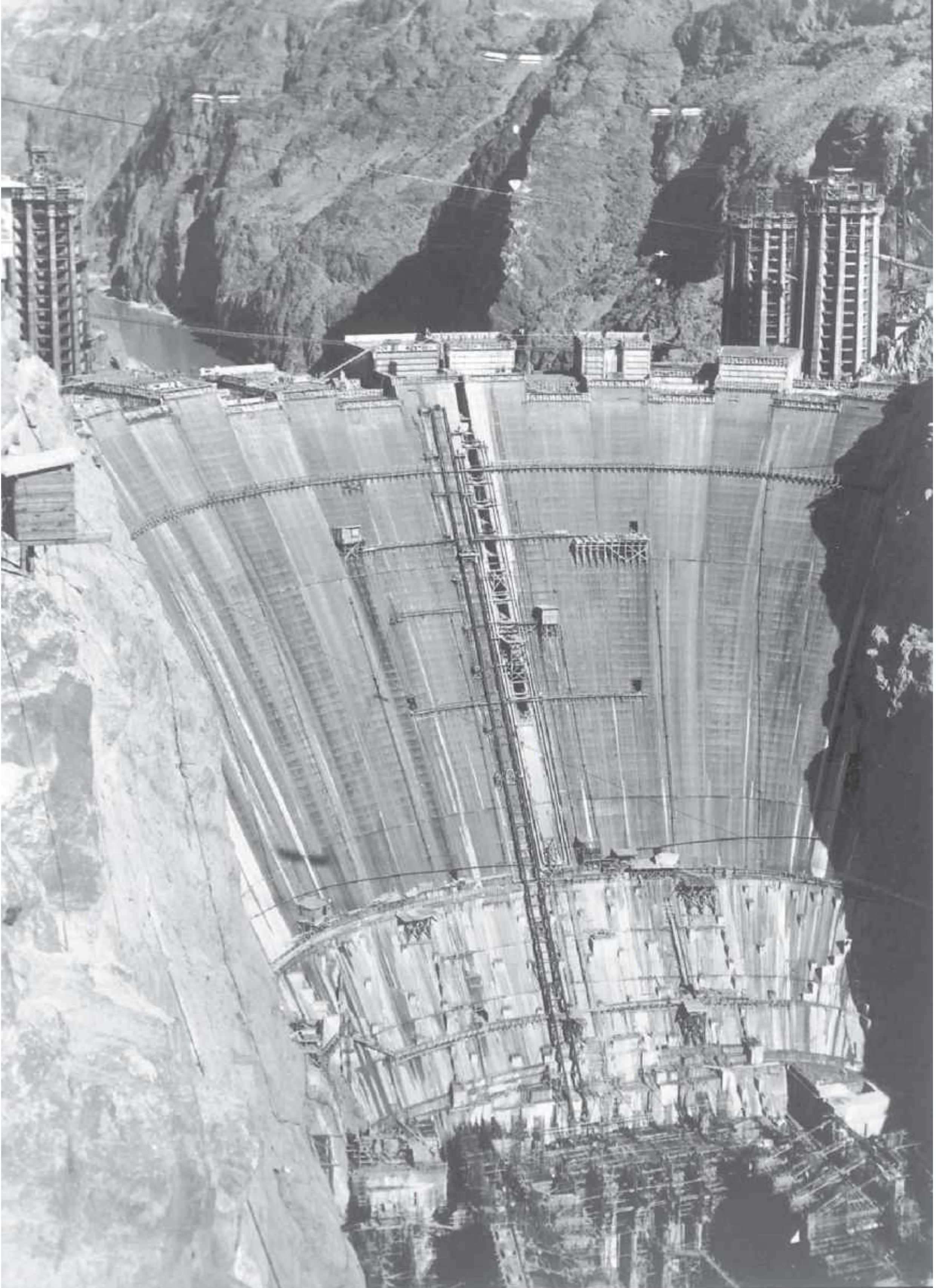
[illegible]

[illegible]4900[illegible]2[illegible]30[illegible][10]1850[illegible]19[illegible]20[illegible]

19[illegible]19[illegible]20[illegible]20[illegible]30[illegible]20[illegible]30[illegible]Boulder Dam[illegible]Hoover Dam[illegible]

[illegible]

[illegible]Gamal Abdel Nasser[illegible]1956—1970[illegible]Nkrumah[illegible]1960—1966[illegible]1930—1970[illegible][11]



[illegible] 1934 [illegible] 20 [illegible] 30 [illegible] 1980 [illegible]

20 [illegible] 60 [illegible] 15 [illegible] 1968 [illegible] 20 [illegible] 90 [illegible] 2/3 [illegible][12]

[illegible] 20 [illegible] Sutlej [illegible] Punjab [illegible]“[illegible]”[illegible] 3000 [illegible] 4500 [illegible][13]

[illegible] 1885 [illegible] 16—18 [illegible][14] [illegible]“[illegible]”[illegible] canal colonies [illegible] 1947 [illegible] 1400 [illegible] 1915 [illegible]

[illegible] 1947 [illegible] 1947 [illegible] 1990 [illegible] 1600 [illegible][15] [illegible]

[illegible] 1960 [illegible]——[illegible] 19 [illegible] 60 [illegible] 20 [illegible] 60 [illegible]

[16] 80% 20 90 [17]

20 19 20 1947 2200 1974 3200 90 4500 5000 1/5 1975 “ ” 1947—1982 15% [18] “ ” [19]

20 [20] “ ” 1947—1992 2000 20 60 Rihand [21]

1947 2 4 1955—1985 1300 1996 1/4 [22] Western Ghats [23]

20 20 20 80 90 1989 6 Narmada 30 3000 350 Surat 10 [24]

20

19 [25] 1917 1918 Turkmenistan 20 30

[illegible]20[illegible]30[illegible]

[illegible]1937[illegible]50[illegible]Ural[illegible][26][illegible]Kuban[illegible]Sea of Azov[illegible][27][illegible]1975[illegible]1913[illegible]8[illegible][28][illegible]

20[illegible]50[illegible]Syr Dar’ya[illegible]Amu Dar’ya[illegible]20[illegible]50[illegible]“[illegible]”[illegible]A.Babayev[illegible]50[illegible]

> [illegible]……[illegible][29]

[illegible]700[illegible]“[illegible]”[illegible]

[illegible]1960[illegible]55[illegible]Niger[illegible]Snake[illegible]1960—1961[illegible]1980[illegible]1/5[illegible]1990[illegible]1/10[illegible]20[illegible]60[illegible]1973[illegible]90[illegible]20[illegible]60[illegible]15[illegible]1990[illegible]1960[illegible]1/3[illegible]1960—1993[illegible]3[illegible][30]

[illegible]“[illegible]”[illegible]“Aral Dengiz”[illegible]“[illegible]”[illegible]20[illegible]80[illegible]20[illegible]80[illegible]200[illegible][31]

20[illegible]50[illegible]4[illegible]1990[illegible]Muynak[illegible]90[illegible]24[illegible]20[illegible]1995[illegible]4[illegible]1.2[illegible]1970—1990[illegible]5[illegible]10[illegible]1990[illegible]1960[illegible]3/4[illegible]

[illegible]Karakum Canal[illegible]1100[illegible]Ashkhabad[illegible]1970[illegible]4/5[illegible]20[illegible]80[illegible]

[illegible]1986[illegible]1984[illegible]1986[illegible]1991[illegible][32]

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]——[illegible]20[illegible]

[illegible]5000[illegible][33][illegible]

[illegible]——[illegible]“[illegible]”——[illegible]·[illegible]1769—1849[illegible]1805[illegible]pasha[illegible]1842[illegible]1861[illegible]·[illegible]8[illegible]9[illegible]19[illegible]

[illegible]·[illegible]1855—1882[illegible]6[illegible]1876[illegible]

1882[illegible]1883—1907[illegible]Lord Cromer[illegible]·[illegible]1898[illegible]Baring Brothers[illegible]1902[illegible]1912[illegible]1934[illegible]1934[illegible]1/5[illegible][34]

[illegible]1876[illegible]khedive[illegible]·[illegible]·[illegible]Adrian Danino[illegible]1912[illegible]20[illegible]40[illegible]

1952[illegible]1918—1970[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible][35]

[illegible]evaporation zone[illegible]1949[illegible]

[illegible]1952[illegible]

[illegible]·[illegible]Anthony Eden[illegible]1897—1977[illegible]1952[illegible]1955[illegible]1955[illegible]1956[illegible]1956[illegible]10[illegible]

[illegible]20[illegible]50[illegible]1960[illegible]1971[illegible][36]

[illegible]Lake Nasser[illegible]150[illegible]1934[illegible]30[illegible]98%[illegible][37][illegible]1977—

1990[illegible]1/3[illegible][38][illegible]

[illegible]1963[illegible]50[illegible]1200[illegible]87[illegible]20[illegible]90[illegible][39]

[illegible]3000[illegible]2/3[illegible]7500[illegible]20[illegible]2.4[illegible]19[illegible]5[illegible]8[illegible]1902[illegible]1964[illegible]70[illegible]90[illegible]1996[illegible]1/10[illegible][40]

[illegible]3[illegible]5[illegible]10[illegible]1975[illegible][41][illegible]

[illegible]25[illegible]2500[illegible]salt creep[illegible][42]

[illegible]1/6[illegible]20[illegible]70[illegible]

[illegible]90[illegible]

[illegible]20[illegible]·[illegible]5000[illegible]

[illegible]1959[illegible]5[illegible]Nubian[illegible]Lake Nubia[illegible]20[illegible][43]

[illegible]1964[illegible]——[illegible]10%——[illegible]1869[illegible]Levant[illegible]Lessepsian migrant[illegible]Ferdinand de Lesseps[illegible]Indo-Pacific[illegible][44]

[illegible] [illegible]19[illegible]

1890[illegible][45][illegible]1/6[illegible]1/3[illegible]1890[illegible]Apennines[illegible]

[illegible]19[illegible]Lombards[illegible]

[46]□□□□□□1866□□□□□□□Cavour Canal□□□□□□□□□□1861□□□□□□
□□□1882□□□□□□□□□□□□□□□□□□□□□□channelization□□□□□□□□□□
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□□□□□□□□1882—1914□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□
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□□□“□□□□”□revolution of the waters□□□□□[48]□□19□90□□□
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1924□□□□□□□□□180□□□□□□□□□15□□□1000□□1937□□□□□□□□□□
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1890□□
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□20□□30□□□□□□□□□□□□□1922—1943□□□□□□□□□□□□□□□□□□□□□
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□1935—1936□□□□□□□□□□□□□□□□□1936—1938□□□□□1936□□□□

[illegible]“[illegible]”[illegible]mare nostrum[illegible][52]

[illegible]·[illegible]Umberto Boccioni[illegible]1882—1916[illegible]

[illegible][53]

[illegible]1919[illegible]1890[illegible][54]

[illegible] 1900[illegible]——[illegible]San Joaquin-Sacramento River[illegible]——[illegible]Snake-Columbia River[illegible]1900[illegible][55]

[illegible]17[illegible]1900[illegible]

1900[illegible]Imperial Valley[illegible]Alamo Canal[illegible]1905[illegible]Salton Sea[illegible][56][illegible]1911[illegible]Salt River[illegible]1935[illegible]1964[illegible]19[illegible]

1964[illegible]1983[illegible]1917—1961[illegible]20[illegible]80[illegible]1500[illegible]

[illegible]7[illegible]20[illegible]Baja California[illegible]Sonora[illegible]1950[illegible]Morelos Dam[illegible]1973[illegible]1979[illegible]1905[illegible]·[illegible]20[illegible]

[illegible]20[illegible]50[illegible]Sierra Club[illegible]Audubon Society[illegible]Dinosaur National Park[illegible]Glen Canyon Dam[illegible]1964—1965[illegible]

[illegible]

[illegible]20[illegible]4.1[illegible]——[illegible]Tigris-Euphrates[illegible]Zambezi[illegible]la Plata[illegible][57]

[illegible]1900—1995[illegible]5000[illegible]2.5[illegible]5.1[illegible]

[illegible]5.1 [illegible]1900—1990[illegible]

年份	全球总面积（百万公顷）
1800	8
…	…
1900	48
…	…
1950	94
1960	137
1970	168
1980	211
1990	235
1995	255

[illegible]Gleick 1993[illegible]265[illegible]Postel 1999[illegible]41

[illegible]1950—1980[illegible]1950—1976[illegible][58][illegible]1980[illegible]20[illegible]

20[illegible]90[illegible]1919[illegible]1866—1925[illegible]70[illegible]100[illegible]200[illegible]river dolphin[illegible]10%[illegible][59][illegible]

[illegible]1990[illegible]16%[illegible]30%[illegible]1995[illegible]7%[illegible]20%[illegible]20[illegible]

[illegible]20[illegible]1980[illegible]1/4[illegible][60][illegible]20[illegible]90[illegible]10%[illegible]1996[illegible][61][illegible]20[illegible]

[illegible]20[illegible]4000[illegible]20[illegible][62][illegible]20[illegible]



[illegible]Mali[illegible]N’Debougou[illegible]6[illegible]1.6[illegible]1950[illegible]1950[illegible]

[illegible]

[illegible]20[illegible]

[illegible]1800[illegible]1800[illegible]1990[illegible]1/4[illegible]6%[illegible]7%[illegible][63][illegible]

[illegible]41%[illegible]18[illegible]19[illegible]1895[illegible]1927[illegible]Cairo[illegible]170[illegible]160[illegible]1928[illegible]

[illegible]1928[illegible]*Flood Control Acts*[illegible]1936[illegible]1932—1955[illegible]229[illegible]1951[illegible]1965[illegible]1969[illegible]1973[illegible]1990[illegible]26[illegible]60[illegible]1993[illegible]9[illegible]50[illegible]120[illegible]1993[illegible]90[illegible][64]


"LOOK FOR LORECO"

1927[illegible]170[illegible]
[illegible]Melville[illegible]



1927□□□□□□□□□□50□□
□□□□□□□1927□5□18□□□□□□□

[illegible]oxbow lake[illegible][65]

[illegible]20[illegible]60[illegible]

[illegible]16—17[illegible]20[illegible]1953[illegible]1630[illegible]the Fens[illegible]20[illegible]1900[illegible][66]

[illegible]19[illegible]Manitoba[illegible]1842[illegible]

[illegible][67]

[illegible]68[illegible][68]1870[illegible]1880[illegible]1000[illegible]1900—1920[illegible]1940—1970[illegible]1970[illegible]1700[illegible][69]

[illegible]1930[illegible]

[illegible]1960[illegible]1870[illegible]Central Valley[illegible]1880[illegible]Florida Everglades[illegible]160[illegible]1970[illegible]1780[illegible]15%[illegible]20[illegible]80[illegible]5300[illegible][70][illegible]20[illegible]1865[illegible]1/3[illegible][71]

[illegible][72][illegible]19[illegible]Sundarbans[illegible]1880—1980[illegible]80[illegible]5[illegible]1970[illegible]1900—1980[illegible]1300[illegible]1920—1980[illegible]2/3[illegible][73]1980[illegible]

[illegible]20[illegible]1000[illegible]15%[illegible]60%[illegible]90%[illegible]90%[illegible]20[illegible][74]

[illegible]20[illegible]70[illegible]1983[illegible]Jonglei Canal[illegible]Dinka[illegible]1998[illegible]1/4[illegible]Pantanal[illegible]20[illegible]90[illegible]20[illegible]

[illegible]

[illegible]20[illegible]20[illegible]

[illegible]1916[illegible]Zuider Zee[illegible]1890[illegible]20[illegible]20[illegible]1932[illegible]60[illegible]13%[illegible]14%[illegible]300[illegible][75]

[illegible]1970[illegible]20[illegible]80[illegible]40%[illegible]19[illegible]70[illegible]1960—1980[illegible]1/5[illegible]10%[illegible]20[illegible]10[illegible]50[illegible][76]

[illegible]

[illegible]20[illegible]20[illegible]18%[illegible]54%[illegible][77][illegible]1/3[illegible]

[illegible]20[illegible]

[illegible]20[illegible]

[1]Worthington 1983[illegible]101[illegible]

[2][illegible]

[3]Opie 1993[illegible]30[illegible]acre-feet[illegible]Gleick 1993[illegible]449 and 162[illegible]30[illegible]

[4]Schwarz et al.1990[illegible]265–7[illegible]Opie 1993[illegible]

[5]Postel 1992[illegible]31–2.

[6][illegible]1981[illegible]Holcomb[illegible]6[illegible]Opie 1993[illegible]154[illegible]

[7][illegible]Hillel 1994[illegible]196–200[illegible]Allan 1994[illegible]75–6[illegible]

[8]Jayal 1985[illegible]96[illegible]Stanners and Bourdeau 1995[illegible]66[illegible]

[9]GEMS 1989[illegible]152[illegible]Smil 1993[illegible]42–4[illegible]Stanners and Bourdeau 1995[illegible]67[illegible]Walker 1990[illegible]289–90.

[10]Garbrecht 1987[illegible]Rouse 1963.

[11][illegible]

[12]NRC 1992[illegible]200[illegible]Petts 1990a,1990b.

[13][illegible]Neuvy 1991[illegible]173[illegible]

[14][illegible]Ali 1988[illegible]Agnihotri 1996[illegible]Gilmartin 1994[illegible]

[15]1993[illegible]80%[illegible]WRI 1996[illegible]241[illegible]

[16]Michel 1967[illegible]455–6.

[17]GEMS 1989[illegible]150[illegible]Hillel 1991[illegible]146–7[illegible]Agnihotri 1996[illegible]54[illegible]

[18]Thukral 1992[illegible]9[illegible]Centre for Science and Environment 1982[illegible]59[illegible]14%[illegible]1947—1979[illegible]

[19]Gadgil and Guha 1995[illegible]78.

[20][illegible]1950—1990[illegible]7[illegible]3[illegible]Mitchell 1995[illegible]196[illegible]1954—1979[illegible]12[illegible]

[21]Thukral 1992[illegible]13–14.

[22]Jayal 1985[illegible]97[illegible]1955—1985[illegible]600[illegible]700[illegible]The Centre for Science and Environment 1982[illegible]6–7[illegible]1300[illegible]600[illegible]1000[illegible]

[23]The Centre for Science and Environment 1982[illegible]56–69[illegible]Whitcombe 1995[illegible]

[24]Baviskar 1995[illegible]Dr.ze et al.1997[illegible]Gadgil and Guha 1995[illegible]66–78.

[25]Moser 1894[illegible]4[illegible]1917[illegible]Klige et al.1996[illegible]

[26]1930—1978[illegible]3[illegible]1978—1994[illegible]1.5[illegible]Micklin 1995[illegible]279[illegible]

[27]Kostin 1986[illegible]Shiklomanov 1990[illegible]38[illegible]Vendrov and Avakyan 1977[illegible]

[28]Gerasimov and Gindin 1977[illegible]61[illegible]Gleick 1993[illegible]70[illegible]1929—1933[illegible]Cecchini 1987[illegible]

[29]Quoted in Precoda 1991[illegible]111.

[30]Gleick 1993，6；Smith 1995，267，1993　　　　　　30　37　　　　　　1.5　　　　　　　　
　　　　　　　　　　　　　　　　　　　　　1960　　　　　　Klige et al.a1996　　

[31]　　S.Ospanov，personal communication,May 1998　　1998　　　　　50　　　　20
　　90　　　　　　　　　　　　　　　　　　40　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　
　　　　　　　　　5%　　Lubin 1995，297。

[32]　　　　　　Feshbach 1995，55–6；Micklin and Williams 1995；Peterson 1993，
111–8；Postel 1996　　Precoda 1991　　　1998　5　　　　　　　　　　　　　　　　Social Science
Research Council　　　　　　　　　　　　　　　　　Weiner 1999，414–28。

[33]　　　shadoof　　　　　　　　　　　　　　　　　　

[34]　　
　　　　　　　Waterbury 1979，88。

[35]　　　　　　　Postel 1999，54　　　　　　1964　5　14　　　　　　　　Waterbury 1979，98
　　　

[36]　　　　　　　　　　　　　Hahn 1991,Collins 1990　　　Louis and Owen 1989。

[37]　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　Stanley 1996　　

[38]　　　　　　　　　　18%　　　　　53%　　　　　　　　　　　　　　　Said 1993，241　　

[39]Kishk 1986；Stanley 1997；White 1988.

[40]Fanos 1995；Stanley 1996　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　
　　　　　　　　　　　　　　　　　　　　5000　　　　

[41]Farley 1991；Hunter et al.1993，43–4；Watts and El Katsha 1997；White
1988　　　　　　　　　20　　30—50　　　　　　　　　　　　　　　　　　　　　

[42]　　　　　　　　　　Burns 1990；Howell and Allan 1994；Hvidt 1995；Kishk 1986；
Mageed 1994；Neuvy 1991，187；Stanley and Warne 1993；Waterbury 1979　　20　
　　　　　　　　　Said 1993　　　　　Ayeb 1996　　　　　　

[43]White 1978　　　　　　　　　　　　　　　　　　　　　46　　　　　　　　　　　　　　　　　　　　　　　　　
　　　　　　　　　　　　　　　　　　　　　　　　　　　　,8 January 1998，A23　　

[44]　　　　　　　　　　　　10%　12%　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　
　　　　Ben Tuvia 1983；Por 1978,Por 1990。

[45]　　　　　　　Sievert 1996。

[46]Bianchi 1989，462–4.

[47]1933　　　　　　　　　　　　　　　　　　　　　Veneto　　　　　40　　　　　　　　　　　　　　　　　　　
　Bevilacqua 1989；Clark 1984，127–30　　　　1939　　　　　　　　　　　　　　　　　　　　　　　
Corona and Massullo 1989，375–426　　　Robertson 1938。

[48]　　　　　Bevilacqua 1989。

[49]Sievert 1996，89–90　　　　　　　　　　　　　　　　　　　

[50]De Rosa 1989.

[51]Bevilacqua 1989，298–301.

[52]　　　　　　　　Sadkovich 1996　　　　　　　　　　　　　20　　30　　　　　　　　　　　　　　　　　　
　　　　　　　　　　　　

[53]Fontana 1981，138.

[54]　　　　　　Corner 1975 on Ferrara。

[55]　　　　　　Graf 1985；Schwarz et al.1990　　Worster 1985　　　　　　——　　　　　　　
White 1995　　　　　　　　NRC 1989。

[56]　　　　　　　　　　　　　　　　　　　　1905　　　　　　　　　　　　　　　　　　　　　　

[57]Postel 1992　　　　　　　　Lowi 1993　　　　　　Waterbury 1979　　　　　　　Grove
1985。

[58]Smil 1993，45.

[59]Gleick 1999，84–91.

[60]GEMS 1989□150.

[61]Meyer 1996□77.

[62]□□Neuvy 1991□187–9□Obeng 1977□□□□□□□□□Gleick 1993□170–224□□□□□□Gleick 1999□78 and Gutman 1994□Adams 1992□22–3□□□□□□□□“□□□□□”□□□□□□□“□□□□□”□

[63]NRC 1992□169,194□□□□□□90%□□□□□□□□□□□□□□Stanners and Bourdeau 1995□81–2□□

[64]Daniel 1977□Galat and Frazier 1995□Outwater 1996□128–30□Phillips 1994□Turner and Rabalais 1991.

[65]NRC 1992□177□□□□□□□□□□□□□□□□□□□□65%□75%□Stanners and Bourdeau 1995□82□□Adams 1992□128–54□□□□□□□□

[66]De Jong 1987□83–5□Lambert 1971□Williams 1990a.

[67]Prince 1997□121□□□□□□□□□□□□□American Notes□□

[68]Outwater 1996□126.

[69]Prince 1997□Williams 1990a□□2□□□□□□□□□□□□2000□□□□□□□□□□□□□7—19□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□700□□1200□□□□Outwater□□□□□30□□□□□□77□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□Outwater 1996□17–21,31–2□□□□□□□Naiman et al.1986□

[70]□□□□T.E.Dahl,Wetland Losses in the United States□1780s–1980s,Report to Congress,U.S.Department of Interior□□Gleick 1993□295–6□□□□□□□□□□6900□□□□□□□□□□□□□□□□□□□□□Vileisis 1997□

[71]ReVelle and ReVelle 1992□55.

[72]Richards 1990a□Richards and Flint 1990.

[73]J.F.Richards□□□□Gleick 1993□293□Zamora□□□□□□□□Tolba and El-Kholy 1992□170□□□□□□□□□□□□□□Ruddle 1987□

[74]Meyer 1996□72□Tolba and El-Kholy 1992□169–73.

[75]De Jong 1987□83–4□Tolba and El-Kholy 1992□112□van Lier 1991.

[76]Walker 1984.

[77]Postel et al.1996□“□□”□use□□“□□”□appropriation□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

[illegible]6[illegible] [illegible]

[illegible]

——[illegible]Pliny the Elder[illegible]*Natural History*[illegible]

“[illegible]”[illegible]biosphere[illegible]·[illegible]Edward Seuss[illegible]20[illegible]——[illegible]Vladimir Ivanovich Vernadsky[illegible]1863—1945[illegible]Pierre Teilhard de Chardin[illegible]1881—1955[illegible]biota[illegible]

[illegible]35[illegible]400[illegible]400[illegible]50[illegible]3[illegible]4[illegible]coevolution[illegible]

[illegible]20[illegible]seafloor vent[illegible]“[illegible]”[illegible][1][illegible]20[illegible]

[illegible]20[illegible]

[illegible]

[illegible]20[illegible]Homo sapiens[illegible]1880[illegible]20[illegible]

[illegible][2]

[illegible]1880[illegible][3]1880[illegible]·[illegible]Louis Pasteur[illegible]1822—1895[illegible]·[illegible]Robert Koch[illegible]1843—1910[illegible]

[illegible]19[illegible]1880[illegible]1880—1960[illegible][4]

1830[illegible] [illegible]1850[illegible]4[illegible]

1832[illegible]19[illegible]·[illegible]5[illegible]1831[illegible]1890[illegible]1920[illegible][5]

19[illegible]1900[illegible]

19[illegible]1500—1850[illegible]1850[illegible][6][illegible]

[illegible]19[illegible]80[illegible]transmission cycle[illegible]1890[illegible][7]1898[illegible]1904[illegible]1900[illegible]1925[illegible][8]

[illegible]20[illegible]1908[illegible]Rockefeller Institute[illegible]Sanitary Commission[illegible]·[illegible]John D.Rockefeller[illegible]1839—1937[illegible]20[illegible]

20[illegible]United Fruit Company[illegible]Standard Oil[illegible]1920—1923[illegible][9]

[illegible][10][illegible]20[illegible]1880[illegible]1904—1905[illegible][11][illegible]1905[illegible]

1940[illegible] [illegible]20[illegible]1940[illegible]2500[illegible]1877[illegible]J.F.Joubert[illegible][12][illegible][13]

[illegible]1928[illegible]·[illegible]Alexander Fleming[illegible]1881—1955[illegible]1929[illegible]penicillin[illegible]1940[illegible]·[illegible]Howard Florey[illegible]1898—1968[illegible]Peoria[illegible]1943[illegible]1990[illegible]2.5[illegible]

1897[illegible] [illegible]20[illegible]1721[illegible]19[illegible]80[illegible][14][illegible]1897[illegible]1915[illegible]1921[illegible]19[illegible]90[illegible]20[illegible]30[illegible]1923[illegible]

20 30 1937 1945 1954 1962 1945—1963

1920—1990 20 [15]

/ 1915—1922 [16] 1919 1923 1930 “ ” [17] 20 70

1880 1492 150 80% 90% 1880 1880

1948 · George Marshall 1967 U.S.Surgeon General “ ” [18]

1948 10 5000 20 3 1977 1978 1980 Koltsovo [19]

1946 1945 1946

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[illegible][25][illegible]20[illegible][26]

[illegible]1970[illegible]1989[illegible]70[illegible]20[illegible]60[illegible]65[illegible]1995[illegible]58[illegible][27][illegible]1975[illegible][28]

[illegible]1950[illegible]1910—1949[illegible]1950[illegible][29]

[illegible]1945[illegible]1950—1990[illegible]

[illegible]**[30]**[illegible]20[illegible]

[illegible] 20[illegible]5[illegible]1990[illegible]4[illegible]5[illegible][31]

[illegible][32]1902[illegible]1934[illegible]1942[illegible]falciparum malaria[illegible]13[illegible]1944—1995[illegible][33]

[illegible] 1850 [illegible] 1910 [illegible] 1960 [illegible] 1930 [illegible] Anopheles gambiae [illegible] 16 [illegible] 2 [illegible] 1938—1939 [illegible][34] 20 [illegible] 20 [illegible] 1918—1919 [illegible] 3000 [illegible] 20 [illegible] 90 [illegible] 5 [illegible][35] [illegible][36] [illegible]

[illegible] 19 [illegible] 20 [illegible]

[illegible] 1880—1930 [illegible] rinderpest [illegible] tsetse fly [illegible] Glossina [illegible] trypanosomes [illegible] trypanosomiasis [illegible]

[illegible] 1890 [illegible] 1890—1940 [illegible][37]

[illegible] 1900—1905 [illegible] 25 [illegible] 19 [illegible] 80 [illegible] 1925 [illegible] 20 [illegible] 80 [illegible]

[illegible] 1885 [illegible] “[illegible]”[illegible] scramble for Africa [illegible][38]

[illegible] 20 [illegible] 40 [illegible] lassa fever [illegible] 1969 [illegible] Marburg virus [illegible] 1967 [illegible] 1976 [illegible] 1997 [illegible] 230 [illegible] 1959 [illegible] 20 [illegible] 70 [illegible] 20 [illegible] 80 [illegible] 1998 [illegible] 4700 [illegible] 2/3 [illegible] 1978—1998 [illegible] 1400 [illegible][39]

[illegible] 1970 [illegible]

[illegible] 20 [illegible] “[illegible]” [illegible] synanthrope [illegible] 20 [illegible] 90 [illegible] 100 [illegible] 200 [illegible]

[illegible] 1/5 [illegible] 1950 [illegible] 1970 [illegible][40]

[illegible] 1918 [illegible] “[illegible]” [illegible][41]

[illegible]1889[illegible]19[illegible]90[illegible]90%[illegible]2/3[illegible]20[illegible][42]

[illegible]20[illegible][43]20[illegible]4[illegible]

[illegible]1975[illegible]30[illegible][44][illegible]

[illegible]·[illegible]Edward Jenner[illegible]1798[illegible]“[illegible]”[45][illegible]20[illegible]1980[illegible]

[illegible]20[illegible][46]

[illegible]

[illegible]20[illegible]

20[illegible]20[illegible]1/3[illegible]domesticated plants[illegible]——[illegible]1900[illegible]35%[illegible]40%[illegible][47][illegible]1346—1352[illegible]

[illegible][48][illegible]30%[illegible]1.33[illegible]1/4[illegible]2600[illegible]3000[illegible]1/4[illegible]1900[illegible]1995[illegible]6.1[illegible][49]

[illegible]6.1 1990[illegible]

	土地覆盖类别（百万平方千米）			
年份	森林与林地	草地	牧场	耕地
公元前 8000	65	63	0	0
1700	62	63	5	2.7
…	…	…	…	…
1850	60	60	8	5.4
…	…	…	…	…
1890	58	55	13	7.5
1900	58	54	14	8.0
1910	57	52	15	8.6
1920	57	51	16	9.1
1930	56	49	19	10.0
1940	44	47	21	10.8
1950	44	45	23	11.7
1960	53	41	27	12.8
1970	51	38	30	13.9
1980	51	35	33	15.0
1990	48	36	34	15.2

□□□□Graetz 1994□RIVM 1997□table A22□Richards 1990b□WRI 1996□WRI 1997

[illegible]

[illegible]1700[illegible]2%[illegible]3%[illegible]

1700[illegible]1830[illegible]1930[illegible]1930[illegible]1700[illegible]4[illegible]1700—1930[illegible]

[illegible]20[illegible]20[illegible]30[illegible]Peace River[illegible]“[illegible]”[illegible]Virgin Lands[illegible]1954—1960[illegible]1960[illegible]

[illegible]5[illegible]1[illegible]1920[illegible]1930[illegible]1960[illegible]1966[illegible]“[illegible]”[illegible][50]

“[illegible]”[illegible]20[illegible]1950[illegible]1960[illegible]1970[illegible]——[illegible]1960[illegible][51][illegible]Igbo[illegible]

[illegible]20[illegible]80[illegible]1997[illegible]“[illegible]”[illegible]1/4[illegible]1972—1989[illegible][52][illegible]1978—1992[illegible]

[illegible]6%[illegible]20[illegible]90[illegible][53][illegible]1985[illegible]

20[illegible]2[illegible]4[illegible]

[illegible]1900[illegible]1000[illegible]1[illegible]2[illegible]70%[illegible]90%[illegible][54]

[illegible]20[illegible]90[illegible]10%[illegible]4[illegible]1945[illegible]

[illegible]19[illegible]30[illegible]1861—1865[illegible]19[illegible]50[illegible]1892[illegible]1920—1955[illegible]20[illegible]30[illegible][55][illegible]6.2[illegible]1950[illegible][56]1970[illegible][57][illegible]1980[illegible]80[illegible][58]

[illegible]6.2 [illegible]1920—1990[illegible]

	数量（单位：百万）		
年份	美国	苏联	全球
1920	0.25	0	0.3
1930	1.0	0.05	1.1
1940	1.6	0.5	3
1950	3.4	0.6	6
1960	4.7	1.3	10
1970	4.6	2.0	16
1980	4.8	2.4	24
1990	4.6	2.7	26

[illegible]Stanton 1998[illegible]Vasey 1992[illegible]Volin 1970

[illegible]harvesting combine[illegible]20[illegible]20[illegible][59][illegible]monoculture[illegible][60][illegible][61][illegible]

[illegible]1920[illegible]
1/4[illegible]

[illegible]
1920[illegible]1990[illegible]2%[illegible]3%[illegible]
[illegible]20[illegible]40[illegible]
[illegible]20[illegible]80[illegible]30%[illegible]
[illegible]

[illegible]1890—1930[illegible]
1935—1985[illegible]3[illegible]1940[illegible]
1600[illegible]1968[illegible]1.1[illegible]1977[illegible]4[illegible]
[illegible]3[illegible][62]

[illegible]
[illegible]20[illegible]

[illegible] [illegible]Green Revolution[illegible]
[illegible]20[illegible]40[illegible]
60[illegible]70[illegible]
[illegible]dwarf
wheat[illegible]20[illegible]
[illegible]

[illegible]
[illegible]Gregor Mendel[illegible]1822—1884[illegible]
[illegible]mathematical genetics[illegible]1900[illegible]
[illegible]
19[illegible]80[illegible]
[illegible]1925[illegible]
[illegible]10[illegible]1935[illegible]

[illegible]1946[illegible]10[illegible]10[illegible][63]

[illegible]1876[illegible]1918[illegible]double-cross[illegible]1930[illegible]1%[illegible]10[illegible]1939[illegible]1/6[illegible]1950[illegible]3/4[illegible]1970[illegible]99%[illegible]20[illegible]3[illegible]4[illegible][64]

[illegible]20[illegible]20[illegible]·[illegible]Henry Wallace[illegible][65][illegible]“[illegible]”[illegible]1941—1943[illegible]·[illegible]Norman Borlaug[illegible]1914[illegible][66]1944[illegible]·[illegible]1953[illegible]10[illegible]

[illegible]1970[illegible]Hermosillo[illegible]U.S.Agency for International Development,AID[illegible]1963[illegible]1968[illegible]18[illegible][67]

1960[illegible]International Rice Research Institute[illegible]IRRI[illegible][68][illegible]20[illegible]20[illegible]60[illegible]1959[illegible]1959—1961[illegible]“[illegible]”[illegible][69]

[illegible][70][illegible]20[illegible]60[illegible]1949[illegible]

[illegible]

[illegible][71][illegible]20[illegible]60[illegible]70[illegible]

[illegible]1970[illegible]10%[illegible]15%[illegible]1983[illegible]1991[illegible]3/4[illegible][72]1990[illegible]95%[illegible]

[illegible]1960—1990[illegible]17[illegible]60%[illegible]90%[illegible]“[illegible]”[illegible]1680[illegible]70[illegible]90[illegible]1800—1950[illegible][73][illegible]1492[illegible]900[illegible]6.3[illegible]1960[illegible]

[illegible]6.3 93[illegible]1961—1992[illegible]

	单产量（公斤／公顷）				
作物	1961—1963	1969—1971	1979—1981	1990—1992	增长系数 1961—1992
小麦	868	1153	1637	2364	2.7
稻米	1818	2218	2653	3459	1.9
玉米	1157	1456	1958	2531	2.2

[illegible]WRI 1996[illegible]226

[illegible][74][illegible]1990[illegible]1985[illegible]100[illegible]2/3[illegible][75][illegible]5[illegible][76][illegible][77]

[illegible]“[illegible]”[illegible]Green Revolution kulaks[illegible][78]

[illegible]

[illegible]“[illegible]”[illegible]1950[illegible]7[illegible]1985[illegible]36[illegible]36[illegible]1981[illegible][79]

[illegible]1846[illegible]Corn Laws[illegible]1890—1940[illegible]20[illegible]30[illegible]1942[illegible]1947[illegible]20[illegible]80[illegible]1936[illegible]30%[illegible]1986[illegible][80][illegible]1945[illegible][81][illegible]20[illegible]60[illegible]1960[illegible]1965[illegible]genetic manipulation[illegible][82]

[illegible]

1940[illegible]20[illegible]1996

[illegible]prime farmland[illegible][83]

[illegible]20[illegible]

[illegible]20[illegible]

[illegible]“[illegible]”[illegible][84][illegible]

[1][illegible]“[illegible]”[illegible]

[2][illegible]

[3][illegible]Mercer 1990[illegible]

[4][illegible]Hays 1998[illegible]

[5][illegible]20[illegible]10[illegible]1940[illegible]1960[illegible]

[6]Northrup 1995[illegible]120–4.

[7]Curtin 1989.

[8][illegible]19[illegible]Lyons 1992[illegible]Kunitz 1994[illegible]

[9]Jennings 1988[illegible]28–32[illegible]Ettling 1981[illegible]1916[illegible]Hewa 1992[illegible]Chomsky 1996[illegible]

[10]McNeill 1976[illegible]235–91[illegible]Cooter 1993[illegible]

[11][illegible]1907—1970[illegible]Miège 1989[illegible]211[illegible]

[12]Dobson and Carper 1996[illegible]

[13][illegible]Masai[illegible]

[14]Moulin 1992[illegible]

[15][illegible]RIVM/UNEP 1997[illegible]96[illegible]1920[illegible]1945[illegible]20[illegible]

[16][illegible]1917[illegible]Hutchinson 1985[illegible]

[17][illegible]Feshbach and Friendly 1992[illegible]37[illegible]Johnson 1988[illegible]Solomon[illegible]Hutchinson 1990[illegible]

[18]Bloom and Murray 1992[illegible]1055[illegible]1969[illegible]Porter 1997[illegible]491[illegible]Tenner 1996[illegible]58[illegible]Garrett 1994[illegible]33[illegible]1967[illegible]

[19][illegible]Fenner 1993 and Oldstone 1998[illegible]27–44[illegible]1958[illegible]1996[illegible]guinea worm disease[illegible]river blindness[illegible]

[20]□□□□□□The Economist,31 May 1997□73–4□□□□□□□□□□□□□

[21]20□□70□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□30□□□□Levy 1992□□□□□□□□□Ralph Gonzales□□□□□□□□□□□□□Washington Post,17 September 1997□A2□□□□□1992□□□□□□□□□□□1/5□□□□□□□□□□□□□□□□

[22]Ewald 1994□65□Raviglione et al.1995□1995□□□20□□□□□□□□□□□bacillus□□□□□□1/3□□□□Dobson and Carper 1996□□

[23]□□□□□□□□□□□Murray and Lopez 1996□□

[24]Epstein et al.1994.

[25]□□□□□□□□□□□□□□□□□□□□20□□5□10□□□20□□60□□Society for General Microbiology 1995□Levy 1992□Garrett 1994□

[26]Garrett 1994□□□□□□□□Murray and Lopez 1996□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

[27]Feshbach and Friendly 1992 □ app.4□Population Reference Bureau,1996,World Population Data Sheet□Bridges and Bridges 1996□178□□□□□□□□□

[28]□□Bloom and Murray 1992□1059–60□□

[29]Lucas 1982□□□1949□□□□□□□□□□□□□□□□Yip 1995□105–14□

[30]□□□□□□□□□□□□□□□□□□□□□□□□□1987—1992□□

[31]□□□□□□□□□□□□□□□□□□□□□□□□□Brinkmann 1994□304–6□□Brinkmann□□Kunitz 1994□11□

[32]□□Gallagher 1990□

[33]Ibid.34–5□Hunter et al.1993□43–4.

[34]Curtin 1993□346–7.

[35]Chen 1994□323.

[36]Shope and Evans 1993.

[37]Giblin 1992.

[38]Ford 1971□Lyons 1992□Hoppe 1997□Giblin 1990 and 1992□Maddox et al.1996□Headrick 1994□67–94□273–384□□□20□□20□□□□□□□□□□□□□□□□□□Congo-Océan railway□□□□10%□30%□□Headrick 1994□68□□Waller 1990□□□□□□□□□□□□□□□□□□□□□□□□□

[39]□□Morse 1993□□□□□□Murphy 1994□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□The Economist,4 July 1998□79□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□Science News 153□85□□□□□□□□□□□□□□□□□□□□□□□The Economist,6 February 1999□86□□Beatrice Hahn□□□□□□□□□□□□□□□□□□□□□□□□□1920□□□□□□□□□□□□□□□□□□□□□□□□1960□□□□□□□□□□□□1945□□□□□□1974□□□□□□□Lyme disease□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□150□□□□□□Spielman 1994□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□19□□

[40]□□□□□□□□□□□Hantavirus□□□□□□□□□Argentine hemorrhagic fever□□□□□□□□□□□□□□□□□□

[41]Beveridge 1993□Murphy and Nathanson 1994□

[42]□□□□□Dobson and May 1986□Ford 1971□138–40□Iliffe 1995□208–11□Ranger 1992□Spinage 1962□

[43]20□□□□□□□□Guayaquil□□□Pineo 1996□□

[44]□□□30□□□□□□□□WHO 1996□

[45]Wills 1996□29□□□□

[46]□□□Cliff et al.1998□□□□□□□□□□□□□□□

[47]RIVM/UNEP 1997□75□Vitousek et al.1986.

[48]□□1980□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□Houghton 1994□□□□□□□□□□□□□□□□□□□□□□□□□□

[49]Hannah et al.1994□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□20□□90□□□□□□□□□27%□□□□□□□□□□□□□□□□□□□□□□□□□□/□□□□□□“□□□□□”□□□□□□□10□□

[50]Ioffe and Nefedova 1997□71-5.

[51]□□□□□□□□□□□□□□□□□□□□Houghton 1994□□1960□□□□□□□□□□□□□□□400□□□□□□1970□□□□□□□□□100□□□□□□□□□□□□600□□1000□□□□□□□□20□□50□□□□□□□□□□□□□1940□□□□□□□□□□□□□□□□

[52]Biswas 1994□□□□□□□□□□□□□□8.4%□

[53]□1945—1990□□□□□□□□□200□□□□□□□□20□□90□□□□□□500□□1000□□□□Gardner 1997□49□Xu and Peel 1991□258□□Smil 1993□57□□□1957—1990□□□□□1500□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□Douglas 1994□Biswas 1994□□□□150□□□□□□□□□□□□□□□700□□800□□□□□□□□□□□□□□

[54]□□□□□□□□□□□□□□□□□□□□□□□□□□□□1900□□1900□□□□□□□□□□□45%□□□□□□□□□□□□□□□1990□□□□□□□□80%□Solbrig and Solbrig 1994□224□□□□1900□□□□□□□□□□Vasey 1992□

[55]Fitzgerald 1996□□□□□□□□□□□□□□□1929□□□□□□□□□□

[56]□□□□□□Nielsen 1988□□□□□□□Walsh 1992□□□□□□□Gunst 1990□20□□60□□□□□□□□□□□□□□□□□□□□□□1970□□□□□□□□□□□□□□□□□□

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[58]□□□□□□□□□□Grigg 1992□49–51□□□□□□□□□Rasmussen 1982□Mannion 1995□95–104□

[59]□□□□□□□□□□□□□□□□□50%□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

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[61]□□Andreas Kruess and Teja Tscharntke,Science News,June 11,1994□375□□□□

[62]Bairoch 1989□327□□□□□□□□□□□□□□□19□□□□3□□□□□20□□□□13□□□□1985□□□□□□□□□□□□1950□□□□

[63]Hayami and Yamada 1991□Hayami 1975□□□□□□□□□□□□□□□□□□□□□□□1912□□□□□□□□□1932□□□□□1/4□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□70□□□□□□□□□□□□□□□□□□□□□□□Dalrymple 1974□10–11□□

[64]Mangelsdorf 1974□211–14□□□□□□□□□□□□□□□□“□□”□generation□□□□□□□□□□□□□□□□□Fitzgerald 1990□

[65]□□□□1888—1965□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□1941□□Progressive Party□□□□□□□□

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[66]Jennings 1988□□□□□□□□□□□□□□□□□□□□□□□□□□□□□1940□□□□□□□□□Avila Camacho□□□□□□□□□□□□□Lázaro Cárdenas□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□Fitzgerald 1986□

[67]Lupton 1987□68–9.

[68]Anderson 1991.

[69]Dalrymple 1974□10–15,73–75.

[70]□□□□□□□□1930□□□□□□□□□□□□□1947□□□□□□□SR52□□1950□□□□□□□□□□□□□□□□□□SR-52□□□□□□□□□50%□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□Jahnke et al.1987□□□Low 1985□□

[71]□□1964□□□□□480□U.S.Public Law 480□□□□□□□□□□□□□□□□□□□

[72]Tolba and El-Kholy 1992□296□WRI 1996□226.

[73]Bairoch 1989.

[74]1955—1988□□□□□□□□□□□4□□Tolba and El-Kholy 1992□295□□□

[75]Ibid.p.296□□□Pimentel and Lehman 1993□

[76]□□□□□1970□□□□□□□□□□□□□□□15%□□□□□□□□□□□1971□□□□□□□□□□genetic profile□□Mangelsdorf 1974□213□□

[77]□□□□□□□□□□□□□□Freeman 1993□□□□□□□□□□□□□Pimentel and Heichel 1991□□□□□□□□□□□□□□□□□□□□□25%□□□□□□□□50%□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

[78]□□□□□□□□□□□□□□□□□□Shiva 1991b□Thandi 1994□□□□□□□Hazell and Ramasamy 1991□□□□□□□□□□□□□□□□□Alauddin and Tisdell 1991□□□□□□□□□□□□□□□□Simonian 1995□170–72 and Sonnenfeld 1992□□□□□□□□□□□□□□□□Sharma and Poleman 1993□David and Otsuka 1994□Bezuneh and MabbsZeno 1984□□□□□□□□□□□□□□20□□70□□□□□□□

[79]Bairoch 1989□346□

[80]Blaxter and Robertson 1995□□□

[81]□□Cochrane 1993□Hayami and Yamada 1991□□1880—1985□□100□□□□□□□□□□□□□□□□□□□□□□16□□□□□□□□□□□□□□4.4□□Hayami and Yamada 1991□253–4□□

[82]□□□□□□□□□□Burmeister 1990□□Freeman 1993□

[83]□□□□Dennis Avery□□□□□□□□□□The Economist,16 July 1996□23□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

[84]Epistles 10□24□“Naturam expellas furca tamen usque recurret”.

[illegible]7[illegible] [illegible]

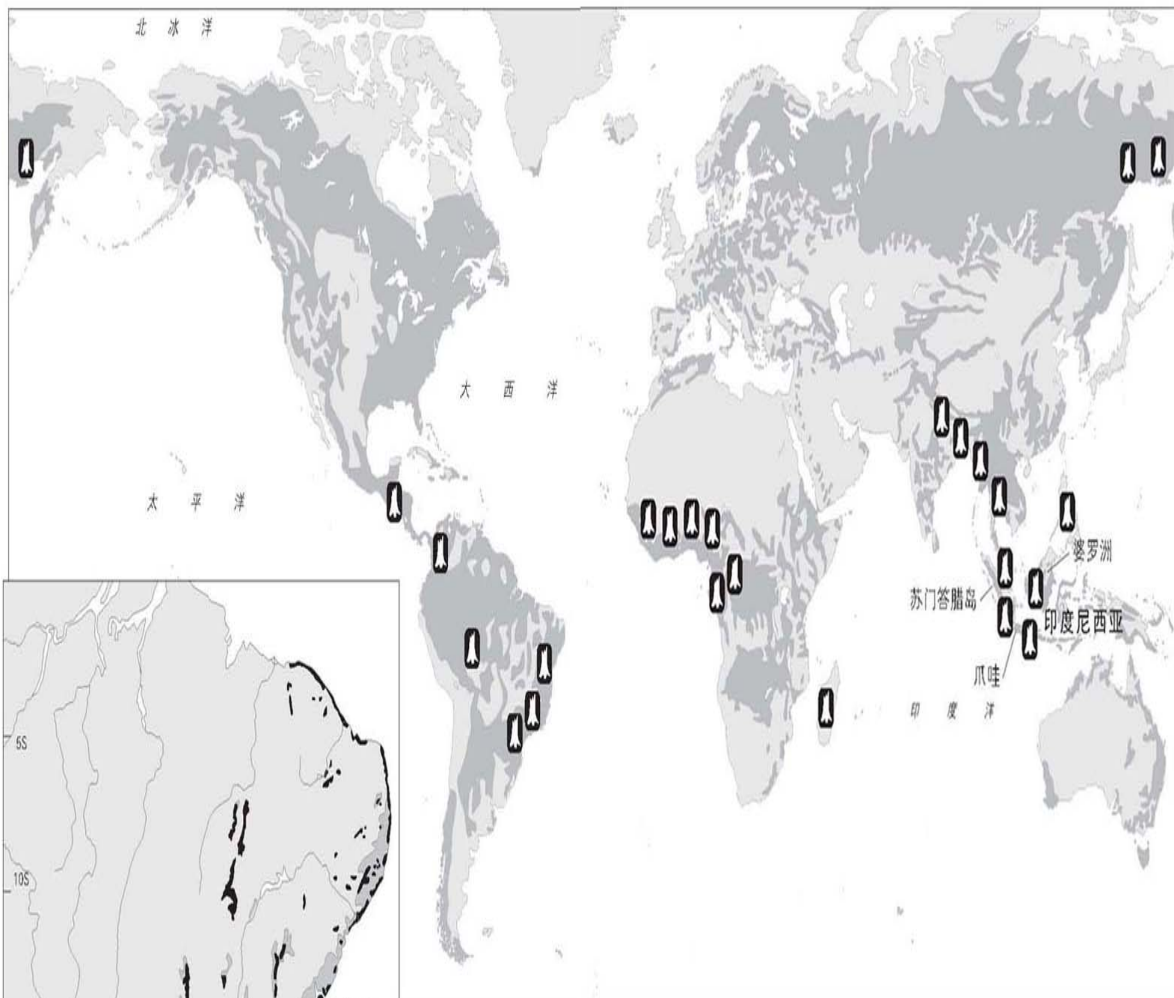
[illegible]

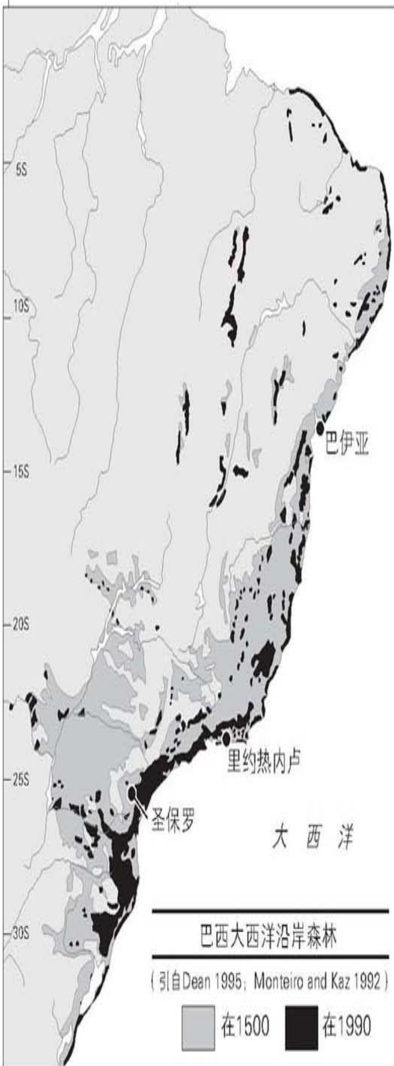
——[illegible]Maimonides[illegible]*The Guide for the Perplexed*[illegible]

[illegible]20[illegible]20[illegible]

[illegible]

[illegible][1][illegible]15%[illegible]45%[illegible][2][illegible]1/3[illegible]3/4[illegible]2/3[illegible]20[illegible]Orinoco[illegible]20[illegible]1960—1990[illegible][3]





7. 世界森林分布的变化（1920—1990年）

1920年世界森林分布
（引自Zon and Sparhawk, 1923）


20世纪森林遭快速砍伐的区域

[illegible]1860[illegible]90%[illegible][4][illegible]20[illegible]100[illegible]1/6[illegible][5]

[illegible]20[illegible]1910[illegible]1945[illegible]1960[illegible]

[illegible] 1500[illegible]1500[illegible]1607[illegible]30[illegible]1910[illegible]New Brunswick[illegible]20[illegible]1/4[illegible]1920[illegible]1607—1920[illegible]

[illegible]1920[illegible]1840[illegible]20[illegible]30[illegible]1907[illegible]1910[illegible]1935[illegible]1930—1960[illegible]90%[illegible]1920[illegible][6]

[illegible]1850[illegible]20[illegible]·[illegible]Monteiro Lobato[illegible]“[illegible]……[illegible]”[7][illegible]20[illegible]20[illegible]Recife[illegible]Rio Grande do Sul[illegible]

[illegible]1900[illegible]40[illegible]——[illegible]1950[illegible]1990[illegible]8%[illegible]20[illegible]60[illegible]

□□□□□□□□□□□□□□□□□□□□1960□□1997□□□□□□□□□□□□□□□□□□□□□□□□10%□□□□□□□□□□□□[8]

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□□□□□□□□□□□□□□□□□□□□□□□□□□□□□1610□□1949□□20□□□□□□1955□□□□□□□□□□□□□□□□□□□□□□□□□[11]□□□□□□□□□□□□□□□□□□□1965□□□

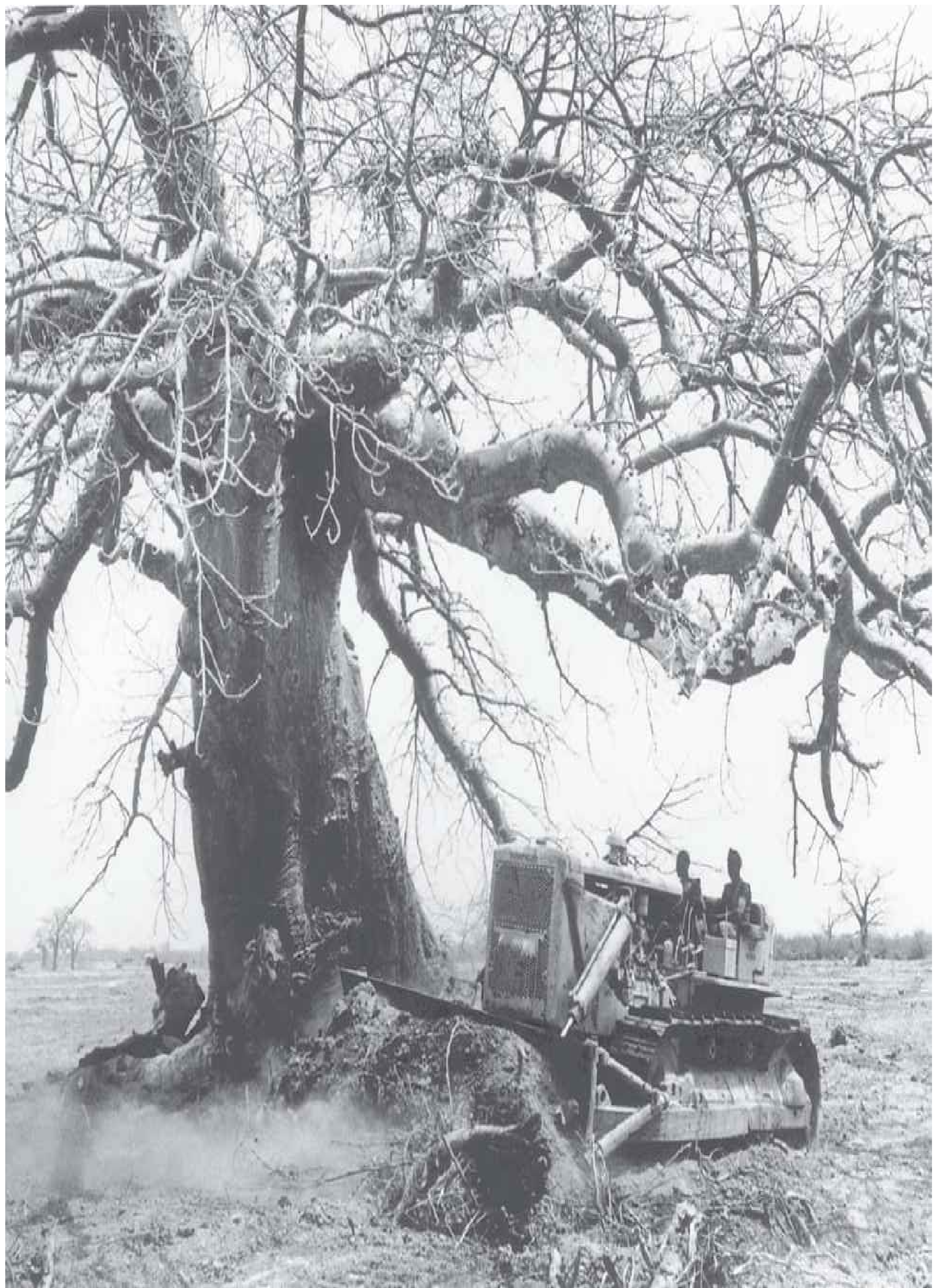
□□□□□□□□□□□□□□□□□□□□□1677□□1930□□□□□4200□□□□□□□□1600□□□300□□400□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□1942—1945□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□1941—1967□□□□□□□□□□□□□1985□□□□1.05□□□□□□□□□□□□□□□□20□□60□□□□□□□□□□□□□□□[12]□□□□□□□□□□□□□□□□□□□1860—1941□□□□□□□□□□□[13]□□□□□□□□□□□□□□□□□□□

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[illegible]

[illegible]20[illegible]80[illegible]1982[illegible]1980[illegible]20[illegible][14][illegible]1990[illegible]1/3[illegible]1992[illegible]2000[illegible]1997—1998[illegible][15]

[illegible]15[illegible]20[illegible]90[illegible]1/3[illegible]1960—1990[illegible][16][illegible]1/3[illegible]20[illegible]20[illegible]1980[illegible][17]



[illegible] baobab [illegible] 1950 [illegible] 1950 [illegible]

[illegible]

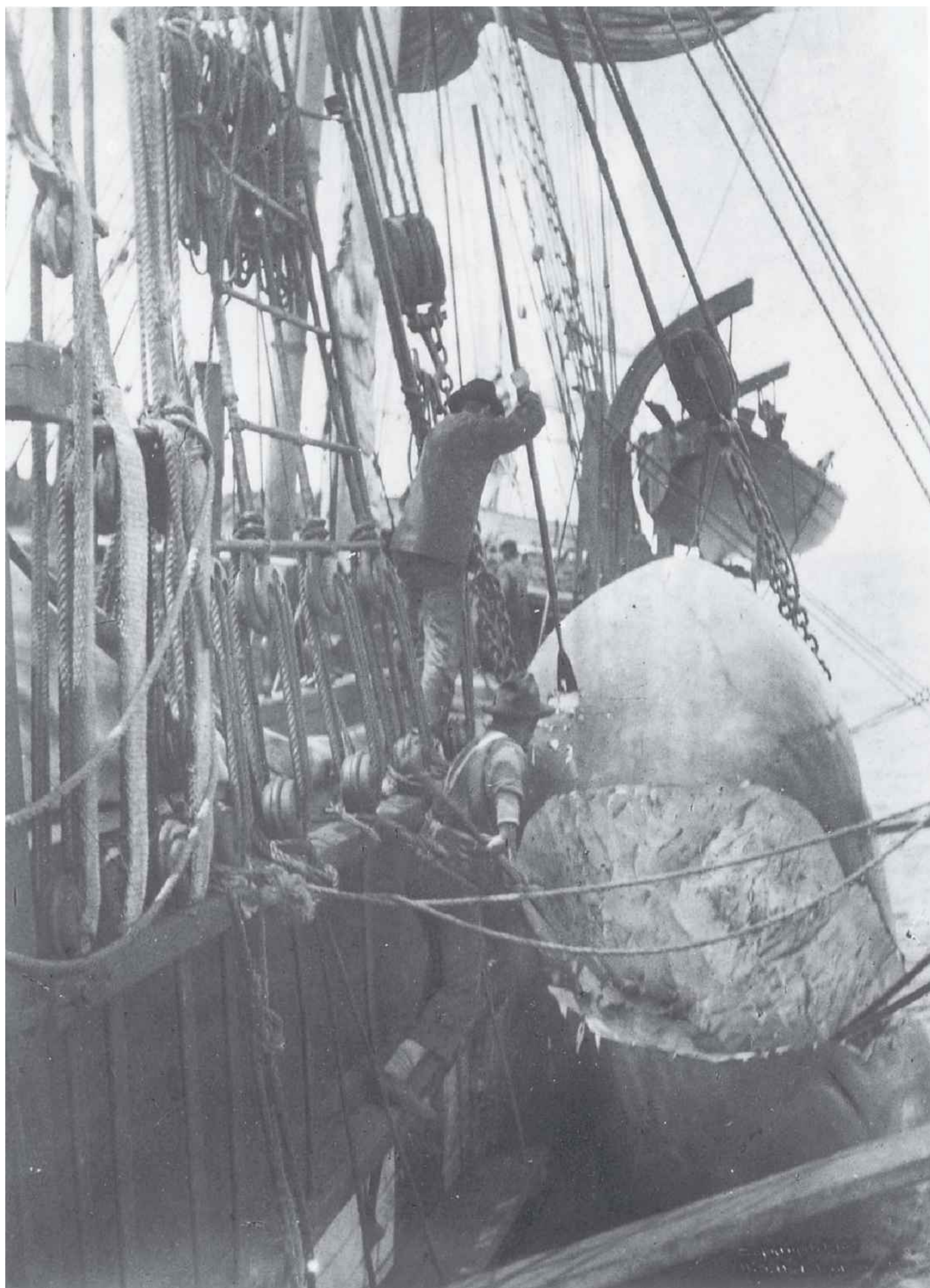
[illegible]

[illegible] 20 [illegible]

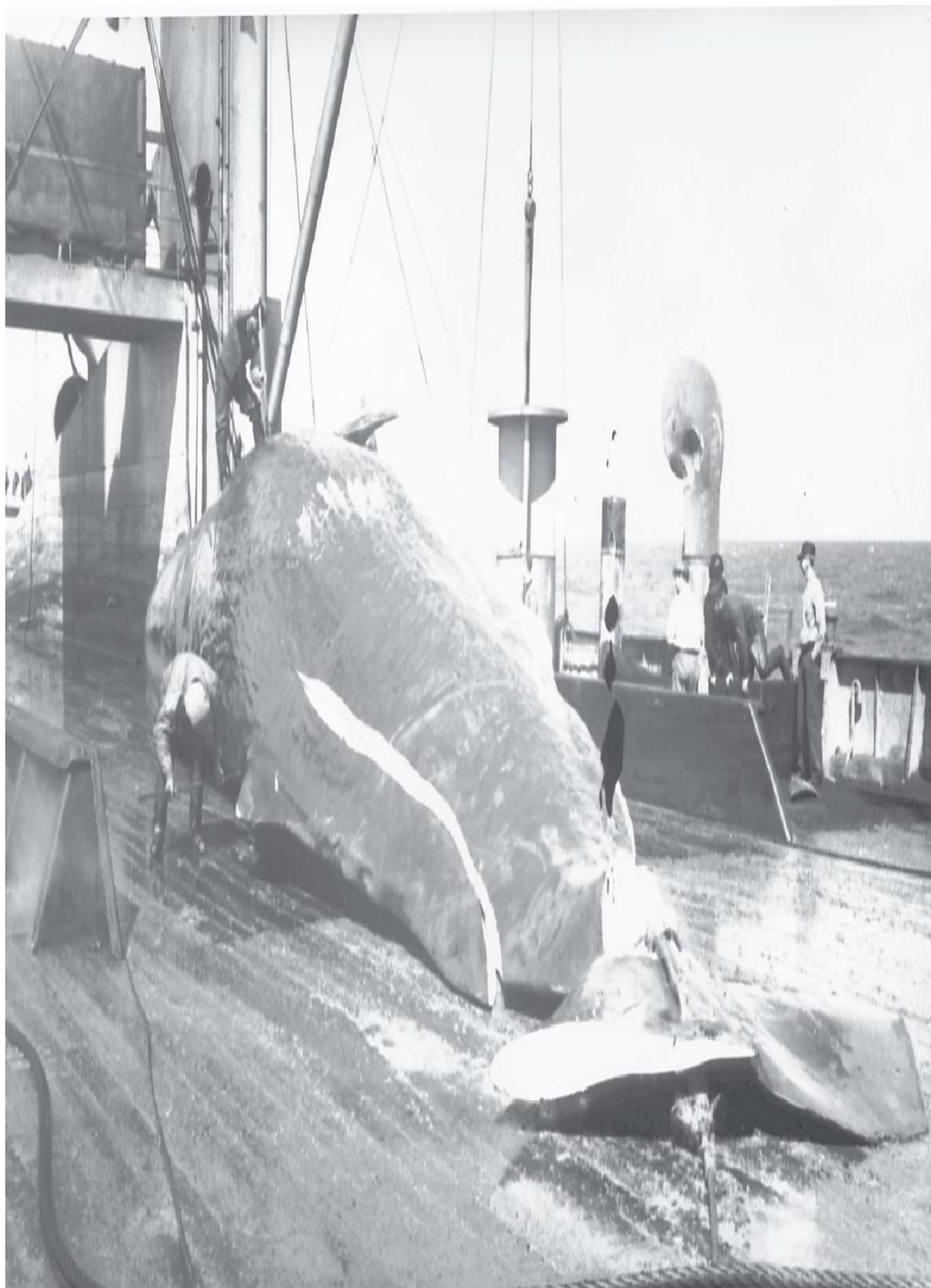
1904 [illegible][18] [illegible] 5000 [illegible] 19 [illegible] 1610—1840 [illegible] Spitzbergen [illegible] bowhead whale [illegible][19] [illegible] 19 [illegible] 1820—1860 [illegible] 1860 [illegible] sperm whale [illegible] right whale [illegible] 1890 [illegible] Aleut [illegible] Chukchi [illegible] 1900 [illegible] “[illegible]” [illegible][20] [illegible]

[illegible] fin whale [illegible] sei whale [illegible] Bryde’s whale [illegible] minke whale [illegible] 1900 [illegible] 100 [illegible][21] [illegible]

[illegible]1864—1868[illegible]·[illegible]Svend Føyn[illegible]1809—1894[illegible]harpoon cannon[illegible]·[illegible]Moby Dick[illegible]Ahab[illegible]“[illegible]”[illegible]1950[illegible]1904[illegible]1910[illegible]humpback whale[illegible]1911[illegible]1915[illegible]South Georgia[illegible]South Shetlands[illegible]·[illegible]Sir William Allardyce[illegible]



[illegible]1903[illegible]1860[illegible]
1904[illegible]20[illegible]
[illegible]1960[illegible]8[illegible]



[illegible]1939[illegible]20[illegible]75[illegible]

[illegible]·[illegible]Petter Sϕrlle[illegible]stern slipway[illegible]1925[illegible]20[illegible]20[illegible]30[illegible]10[illegible]1934[illegible]1946[illegible]

[illegible][22][illegible]1903[illegible]20[illegible]20[illegible][23]

[illegible]1913—1938[illegible]20[illegible]50[illegible]“[illegible]”[illegible]1904[illegible]1900[illegible]15[illegible]25[illegible]1989[illegible]500[illegible]1900[illegible]70[illegible]1982[illegible]7[illegible]1989[illegible]2[illegible]20[illegible][24]

[illegible]1935[illegible]League of Nations[illegible]1946[illegible]International Whaling Commission[illegible]1964[illegible]1965[illegible]20[illegible]70[illegible]9[illegible]1949—1980[illegible][25][illegible]Aristotle Onassis[illegible]20[illegible]50[illegible][26]1963[illegible]20[illegible]60[illegible]1982[illegible]1986[illegible]“[illegible]”[illegible]1986[illegible]1990[illegible]

[illegible]60[illegible]100[illegible][27]

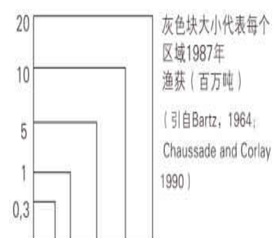
[illegible]150[illegible]1904—1985[illegible]biomass[illegible]4300[illegible]600[illegible]20[illegible]30[illegible]1935—1960[illegible]1950[illegible][28][illegible]20[illegible][29]

8. 20世纪末的渔业

海洋渔业分布区

联合国粮农组织划分的世界海域

ARCTIC 海洋名



北冰洋

白令海

西北太平洋

东北太平洋

北太平洋

中西太平洋

中东太平洋

东南太平洋

南太平洋

西南太平洋

南极太平洋

西北大西洋

东北大西洋

北大西洋

地中海及波罗的海

中西大西洋

中东大西洋

南大西洋

西南大西洋

东南大西洋

南极大西洋

南乔治亚岛

印度洋

西印度洋

东印度洋

南极印度洋

南冰洋

1900[illegible] [illegible]20[illegible]20[illegible]90[illegible]8%[illegible]primary productivity[illegible][30][illegible][31]

[illegible][32][illegible]10[illegible]7.1[illegible]3/4[illegible]by-catch[illegible]20[illegible]90[illegible]1/3[illegible]“[illegible]”[illegible]1/3[illegible]1/2[illegible][33][illegible]20[illegible]40[illegible]1973[illegible]20[illegible]50[illegible]60[illegible]80[illegible]19[illegible]20[illegible]30[illegible][34]

[illegible]20[illegible]20[illegible]80[illegible]90[illegible]“[illegible]”[illegible]

[illegible]7.1 [illegible]1800—1996[illegible]

	渔获量（百万吨）			
年份	海洋	内陆	水产业	总和
1800	≈ 1			
1850	≈ 1.5			
1900	≈ 2.0			
1938	≈ 22			
1945	≈ 13	≈ 5		≈ 18
1950	≈ 15			
1958	≈ 29			
1961—1963	33			

续表

	渔获量（百万吨）			
年份	海洋	内陆	水产业	总和
1964—1966	40			
1967—1969	47			
1970—1972	51			
1973—1975	51			
1976—1978	54			
1979—1981	56			
1982—1984	60	6	7	73
1985—1987	68	6	9	83
1988—1990	71	6	12	89
1991—1993	68	6	15	89
1994—1996	74	7	21	102

□□□□Hilborn 1990□FAOSTAT□□□□□□□□□□□□□□

□□UNFAO 1997□4□□1950—1994□□□□□□□□□1□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□1950—1994□□□□□□□□□□□□□□□□□□□□□□

□□□□□□□□□□□□□□□□□13□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□1839□□□□□□□□□□□□□□□□□□□[35]□□20□□□20□□20□□□□□20□□30□

[illegible]1946[illegible]1949[illegible]70[illegible][36][illegible]1994[illegible]20[illegible]30[illegible]·[illegible]John Steinbeck[illegible]1945[illegible]1968[illegible][37][illegible]20[illegible][38]

[illegible]20[illegible]50[illegible]Humboldt Current[illegible]anchoveta[illegible]Chilean jack mackerel[illegible]1962[illegible]700[illegible]1967—1971[illegible]1000[illegible]1200[illegible]20%[illegible]1/3[illegible]1972[illegible]470[illegible]15[illegible]200[illegible]400[illegible]15%[illegible]20[illegible]70[illegible]80[illegible]

[illegible]1972[illegible]El Niño[illegible]150[illegible]1982—1983[illegible][39]

[illegible]20[illegible]70[illegible]1945[illegible]1971[illegible]80[illegible]

1971[illegible][40][illegible]1/4[illegible]

1970[illegible]20[illegible]90[illegible]2/3[illegible][41][illegible]20[illegible]90[illegible]900[illegible][42]

[illegible]1950—1971[illegible]

[illegible][43][illegible]20[illegible]70[illegible]200[illegible]exclusive economic zone[illegible]EEZ[illegible]“[illegible]”[illegible][44][illegible]1997[illegible]16[illegible]20[illegible]80[illegible]20[illegible]60[illegible]1990[illegible]1992[illegible]2.5[illegible]——1995[illegible]500[illegible]——[illegible]1970[illegible]1995[illegible][45][illegible]——[illegible]

[illegible]1980[illegible][46]1980[illegible]500[illegible]1996[illegible]2500[illegible]960—1279[illegible]1995[illegible]1988[illegible]80%[illegible]2/3[illegible][47][illegible]10[illegible]15[illegible]20[illegible]21[illegible][48]

[illegible]

[illegible]20[illegible]bioinvasion[illegible][49][illegible]20[illegible]

[illegible]1492—1788[illegible]20[illegible]20[illegible][50]

[illegible]1850—1920[illegible]“[illegible]”[illegible]acclimatization society[illegible]1890—1891[illegible]80[illegible]starling[illegible][51][illegible]Hermann Göring[illegible]Mosel[illegible][52][illegible]

[illegible]boll weevil[illegible]1890[illegible]20[illegible]30[illegible]Mobile[illegible]gypsy moth[illegible]1869[illegible]E.L.Trouvelot[illegible]1906—1991[illegible]1[illegible]20[illegible]90[illegible]1[illegible]1999[illegible]1230[illegible]500[illegible][53]

[illegible]“[illegible]”[illegible]ecological release[illegible]20[illegible][54]

[illegible] [illegible]Oryctolagus cuniculus[illegible][55][illegible]700[illegible]

[illegible]1859[illegible]·[illegible]Thomas Austin[illegible]Victoria[illegible]6[illegible]2[illegible]1870[illegible]wallaby[illegible]rat kangaroo[illegible]60[illegible]1859—1920[illegible]1902—1907[illegible]2100[illegible]“[illegible]”[illegible]1950[illegible]5[illegible]5000[illegible]myxomatosis[illegible]99.8%[illegible]20[illegible]90[illegible]1[illegible][56]

[illegible]1864[illegible]20[illegible]40[illegible]19[illegible]1945—1950[illegible]San Martin[illegible]15[illegible]20[illegible]5[illegible]

[illegible]Natal[illegible]1656[illegible]Robben Island[illegible]800[illegible][57]

[illegible] chestnut blight[illegible]1897[illegible]Progressive Era[illegible]·[illegible]Frank Meyer[illegible]1905—1918[illegible]2500[illegible]50[illegible]25%[illegible]“[illegible]”[illegible][58][illegible]Dutch elm disease[illegible]1927[illegible]

[illegible]1930[illegible]1900—1975[illegible]1/4[illegible]

[illegible] [illegible]20[illegible]1800[illegible]20[illegible]1889—1993[illegible]cheatgrass[illegible]19[illegible]70[illegible]tumbleweed[illegible]20[illegible]40[illegible]“[illegible]”[illegible]professor grass[illegible][59]

[illegible] [illegible]20[illegible][60][illegible]1850[illegible]250[illegible]140[illegible]1840[illegible]20[illegible]1974[illegible]Lake Kariba[illegible]Lake Tanganyika[illegible]“[illegible]”[illegible]aquatic chicken[illegible]tilapia[illegible]Tilapia mossambicus[illegible]niloticus[illegible]1952[illegible]20[illegible]80[illegible][61]

[illegible]Nile perch[illegible]20[illegible]50[illegible]200[illegible]cichlid[illegible]20[illegible]70[illegible][62]

[illegible]Erin Canal[illegible]1825[illegible]Welland Canal[illegible]1829[illegible]1825[illegible]139[illegible]1959[illegible]St.Lawrence Seaway[illegible]

[illegible]ballast water[illegible]sea lamprey[illegible]zebra mussel[illegible]

[illegible]1850[illegible]1920[illegible]30[illegible]1940—1960[illegible]90%[illegible]1956[illegible][63][illegible]1958[illegible]1970[illegible][64]

[illegible]1985[illegible]1986[illegible]1988[illegible]Lake St.Clair[illegible]1996[illegible]20[illegible]90[illegible]10[illegible][65]

[illegible]1979[illegible]1980[illegible]Mnemiopsis leidyi[illegible]1988[illegible]wet biomass[illegible]95%[illegible]2.5[illegible][66]

[illegible]20[illegible]80[illegible]

[illegible]19[illegible]80[illegible]“[illegible]”[illegible]Columbian exchange[illegible]1492[illegible]

[illegible]1930[illegible]1880[illegible][67]

[illegible]“[illegible]”[illegible]·[illegible]Thomas Jefferson[illegible]1743—1826[illegible]85%[illegible]1980[illegible]40[illegible]DDT[illegible]19[illegible][68]

[illegible]1976[illegible]56[illegible]2[illegible]prickly pear cactus[illegible]St.Johns wort[illegible]chrysolina beetle[illegible]20[illegible]20[illegible]1925[illegible]Cactoblastis cactorum[illegible]Klamath weed[illegible]1900[illegible]1944[illegible]200[illegible]1944[illegible]10[illegible]1%[illegible][69]

[illegible]1993[illegible]16[illegible]1990[illegible]1970[illegible]cassava mite[illegible]10[illegible]Typhlodromalus aripo[illegible]1933[illegible]Benin[illegible]1/3[illegible][70]

[illegible]

[illegible]20[illegible]generalist[illegible][71][illegible]——[illegible]——[illegible][72][illegible]

[illegible]1958[illegible]·[illegible]Charles Elton[illegible]“[illegible]”[73]20[illegible]

[illegible]

20[illegible]5[illegible]2.45[illegible]9/10[illegible]6500[illegible]

[illegible]1400[illegible][74]“[illegible]”[illegible]extinction background rate[illegible]3[illegible]200[illegible]5000[illegible]1600[illegible]484[illegible]654[illegible]20[illegible]40[illegible]1000[illegible]1900[illegible]1%[illegible]1995[illegible][75]

[illegible][76][illegible]“[illegible]”[illegible]20[illegible]30%[illegible]50%[illegible]20[illegible][77]

[illegible]crabgrass[illegible]minion biota[illegible]40[illegible]100[illegible][78][illegible]20[illegible]80[illegible]animal biomass[illegible]15%[illegible]5%[illegible]7.2[illegible]

□1920□□□□□□□□□□□□□□□□□□□□20□□□[79]

□7.2 □□□□□□1890—1990□□

	家畜（单位：百万）					
年份	牛	绵羊	山羊	猪	马	家禽
1890	319	356	52	90	51	706
1910	391	418	83	115	73	828
1930	513	567	153	187	88	1203
1950	644	631	187	300	69	1372
1970	1016	1001	325	634	81	2734
1990	1294	1216	587	856	61	10770
1890—1990 年增长率						
	406%	342%	1129%	951%	119%	1525%

□□□□RIVM 1997□95

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□□□□□□□□□□□□□*Theses on Feuerbach*□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□20□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

[illegible]20[illegible]

[illegible]20[illegible]clearcut[illegible]Dayak[illegible]

[illegible]20[illegible]20[illegible]

[illegible]1820[illegible]20[illegible]cyanobacteria[illegible]metabolic path[illegible]1/1000000000[illegible]1/5[illegible]

[1][illegible]“[illegible]”[illegible]

[2]Meyer 1996[illegible]61[illegible]15%[illegible]Williams 1994[illegible]106[illegible]17.6%[illegible]WRI 1997[illegible]46%[illegible]7.1[illegible]26%[illegible]Mather 1990 and Williams 1994[illegible]Williams 1990c[illegible]Richards 1990b[illegible]

[3]WRI 1997[illegible]1960—1990[illegible]4.5[illegible]7.1[illegible]2/3[illegible]20[illegible]17[illegible]10[illegible]Williams 1990c,1994[illegible]90[illegible]E.Matthews.Richards 1990b[illegible]164[illegible]1700—1980[illegible]12[illegible]

[4]Msyhrt 1990[illegible]45.

[5][illegible]20[illegible]80[illegible]2/3[illegible]Westoby 1989[illegible]153[illegible]1960[illegible]10[illegible]1992[illegible]18[illegible]FAOSTAT[illegible]1997[illegible]9[illegible]22[illegible]Planhol 1969[illegible]

[6][illegible]1950[illegible]Mac-Cleery 1994[illegible]1960[illegible]Mather 1990[illegible]Lower 1973[illegible]MacCleery 1994[illegible]Marchak 1995[illegible]Williams 1988,1990c[illegible]20[illegible]80[illegible]1%[illegible]

[7]Quoted in Dean 1995[illegible]245.

[8]Dean 1995[illegible]McNeill 1988[illegible]Houghton et al.1991[illegible]

[9]Totman 1989.

[10]Cox 1988[illegible]Marchak 1995[illegible]117–42.

[11]Brookfield et al.1990[illegible]Feeny 1988.

[12]□□□□□□□□□□□□□□□□□□□□

[13]□□□□□□□Durand 1993□Peluso 1992□Potter 1996□

[14]Potter 1996□□□□11%□□□□□□□□□□□□□□□

[15]Marchak 1995□237–68□Brookfield et al.1990□Westoby 1989□133–8□Potter 1996□Dauvergne 1997.

[16]WRI 1996□201□NRC 1993b□34–5□□□20□□80□□□□□□8%□

[17]□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□Bob Hasan□□□□□□□□□□□□□□□□□□□□□□□□□□Bresnan 1993□267□□□□□□□□□□□□□□□□□□Kummer 1991□

[18]□□□□□□□□□Ellis 1991□Kock 1995□□T.nnessen and Johnsen 1982□□□□□□□□□□Knox 1994□□□

[19]Hilborn 1990□375–6□□□□□□□□□□□1000□□□□□□□□□□□

[20]Hilborn 1990□378□□□□□□□□□National Research Council 1996□187–88□

[21]□□□□□□□60□□□

[22]□□□□□□□□□□□□□1947□□□20□□80□□□□“□□□”□□□

[23]□□□□□□□□□□□□□□□□□□□□□□□□□□20□□□□□□sperm oil□□□□□□□□□□□□□□□□□□□□□□□□□□□□20□□80□□□□□□□□□□□□□□□

[24]Kock 1995 □ 28□Knox 1994 □ 343–6□Payne 1995 □ 269□Tonnessen and Johnsen 1982□751□□□□□□□□□□□□□□□International Whaling Commission□□

[25]Payne 1995□298–99□1959—1961□□Kock 1995□29□1949—1980□□□□□□□□□4.6□□□□□8000□□□□□□□□□□□□□□□□□□□□□□□□□□□□

[26]20□□50□□□flags of convenience□□□□□□□□□□□Ellis 1991□431–3□To/nnessen and Johnsen 1982□534–8□□

[27]Kock 1995□19–23□Gambell 1993□Stoett 1997□□□□□□□□□□□□□□□□□□□□□□□□□Kalland and Moeran 1992□93□

[28]□□□□□□□□□□Knox 1994□349–55□Knox□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□Knox□□□□□□□□□□□□□□□□□□1972□□□Hodgson and Johnston 1997□

[29]Knox 1994□345–6.

[30]Pauly and Christensen 1995.

[31]Caddy 1993□□□□□□□□□□□□□□□□□□

[32]Rothschild 1996□□□□□□□□□□□□□□□□Caddy and Gulland 1983□

[33]□□□□□□□The Economist,19 March 1994□24□□□□□□□□30%□50%□□□□□□□□□□□□Speer et al.1997□5-7□

[34]□□□□□□□□□□□□□□□□□20□□30□□□□□□□□□□□□□7.4□□□□□□□□□□□□□□□Hilborn□□□1800□□□□100□□□□□□□□□□□□28□□□□□□20□□□□□□□□□□1800□□□□□□□□□□□1450□□□□□□□□□□□□□□□□□□Grand Banks□□□□15—18□□□□□□□□□□□□□□□1800□□□□□□□□□□□□□□□□□

[35]Graham 1956□497.

[36]Yamamoto and Imanishi 1992.

[37]20□□90□□□□□□□□□□□1968□□□□□□□1/4□□□□□□□□□□□□□□□□□□□□□□10%□WRI 1997□297□□

[38]□□□□□□□□□□□□□□Carré1982□Glantz 1992□Hilborn 1990□McEvoy 1986□Speer et al.1997□UNFAO 1997□

[39]Caviedes and Fik 1992□1998□□□□□□□□□□□□□□□□□□□□□□□□□□□□50%□75%□

[40]□□□□□□□□□□□□□□□□□□□□□□□□□□□□1992□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□50□70□□□□□□□□□□40□□□□□□□□□□□□□

[41]UNFAO 1997□36,65□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□1991□□□20%□40%□□□□□□□Elmgren 1989□□□1982□□□□□□□□□□□□□□□5□□□

[42]Paul 1987□UNFAO 1997□Troadec 1989.

[43]Ludwig et al.1993□□

[44]□1965—1980□□□□□□□□□□□□□□□□□50□□□□0□Sparks 1984□□

[45]□□□□□□□□□□□□ITQ□□□□□□□□□□□□□□□□□□□□□□□□20□□80□□Hannesson 1994□

[46]□□□□2500□□□□□□□□□Landau 1992□4□□

[47]1982□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□Gujja and Finger-Stich 1996□□□□□□□□□□□□Nakahara 1992□Liao and Shyu 1992□

[48]□□□□□□□□□□Landau 1992□UNFAO 1997□11–13□

[49]□□□□□□□□□□□□□□Elton 1958□Groves and Burdon 1986□Williamson 1996□

[50]Burney 1996□□□□□□□□□10%□□□□□□□□□□□□10%□□□□□□□□□□□□economically significant□□□□□Williamson 1996□□

[51]Tenner 1996□119–21□□□□□□Eugene Schieffelin□□□□□□□□□□□Williamson 1996□46–7□□□□□□□40□□□□□□□□□□□□□□□□Elton 1958□22–4□□□□□□Long 1981□□□□□□□□□□□□□□□□□□□□□□□□□□□20□□60□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

[52]Druett 1983□95□□□□□□□muskrat□□□□□□□□□□□□□□□1905□□□1952□□□□□□□□□□□□□□□□□□□□□□□□□Williamson 1996□89–92□De Vos et al 1956□□□□

[53]□□□□□USOTA 1993□□□□□□□□□□□□□□□□Washington Post,3 February 1999□A15□□□□□□□□□□□□Tenner 1996□110–3□□Conniff 1990□□20□□40□□□□□□□□□□□□□□□□□□□□□□□□□1978□□□

[54]Di Castri 1989□□□□□□□□□□□□□□□□□□□□□□Sykora 1990□Thellung 1915□

[55]Thompson and King 1994□De Vos et al.1956□Jaksic and Fuentes 1991□□□□□□□

[56]Myers 1986.

[57]□63□□□□□□□□□□□2□□□□□□Rattus rattus□□□□□□R.norvegicus□□Mus musculus□□□□□□□□□□□□□□□□□□□□□□□□□Michaux et al.1990□

[58]Anagnostakis and Hillman 1992□Elton 1958□21–4□□□□□□J.L.Harper in von□□□□□Broembsen 1989□□□□□□□□□□□□Karnosky 1979□

[59]Mack 1986,1989□Manning 1995□169–90.

[60]Ashton and Mitchell 1989□114.

[61]Sreenivasan 1991□Fernando and Holcik 1991.

[62]Dennis 1996□178–9□Ogutu-Ohwayo 1990□Williamson 1996□124–5□□□

[63]□□□□□□□□□□□□□□□□□□□Illinois Department of Energy and Natural Resources 1994,3□159–60□□□1965□□

[64]Mills et al.1993□Regier and Goodier 1992□1980□□□Illinois Department of Energy and Natural

Resources 1994,3165–6

[65]Mills et al.1993USOTA 1993Washington Post,14 May 1997H1American Zoologist19966Ludyansky et al.1981100200189050Simberloff 1996

[66]Carlton 1996Travis 1993.

[67]Carlton 1985,1989,1996Carlton and Geller 1993194080

[68]King 1984Busch et al.199592

[69]Dahlsten 1989Groves and Burdon 1986Williamson 1996120–4van den Bosch et al.198221–351996—1997

[70]Washington Post,19 May 1997A3Biocontrol News and Information,June 1998http//pest.cabweb.org81/MEMBER/bni/bni19-2/gennews.htm

[71]Drake et al.1989

[72]10%18%59%Sykora 1990Vitousek et al.1996

[73]Elton 195831.

[74]Heywood and Watson 19953001175“”

[75]Heywood and Watson 1995233–4May et al.199513.

[76]1850passenger pigeon1900Martha191450Redford 19922000400

[77]Heywood and Watson 1995Janetos 1997Kaufman and Mallory 1993Lawton and May 1995Leakey and Lewin 1995Wilson 1992

[78]Heywood and Watson 1995717–8

[79]19972800Washington Post,4 October 1997

[illegible]

[illegible]

——[illegible]·[illegible]José Martí[illegible]1975[illegible]23[illegible]44–5

19[illegible]20[illegible]20[illegible]20[illegible]

[illegible]

[illegible]20[illegible]

[illegible]8[illegible]9[illegible]10[illegible]

[illegible]8[illegible] [illegible]

[illegible]

——[illegible]·[illegible]·[illegible]Marcus Terentius Varro[illegible]*De Re Rustica*[illegible]

20[illegible]20[illegible]20[illegible]40[illegible]

[illegible]

[illegible]

20[illegible]500[illegible]15[illegible]1650[illegible]

[illegible]6[illegible]1950[illegible]

[illegible]“[illegible]”[illegible]demographic transition[illegible][1][illegible]20[illegible]60[illegible]2.1%[illegible]·[illegible]Kenneth Boulding[illegible][2]1970[illegible]1996[illegible]9200[illegible]9500[illegible]

[illegible]1950[illegible]20[illegible]90[illegible]8.1[illegible]

[illegible]8.1 [illegible]1750—1996[illegible]

	百万人					
地区	1750	1800	1850	1900	1950	1996
亚洲	480	602	749	937	1386	3501
欧洲	140	187	266	401	576	728
非洲	95	90	95	120	206	732
北美	1	6	26	81	167	295
中南美	11	19	33	63	162	486
大洋洲	2	2	2	6	13	29

[illegible]Reinhard et al.1968[illegible]680–1[illegible]Population Reference Bureau[illegible]1996[illegible]

[illegible]1900[illegible]McEvedy and Jones 1978[illegible]

[illegible]1850—1950[illegible]1950[illegible]1950[illegible][3]

[illegible]20[illegible]90[illegible]0.1%[illegible]5%[illegible][4][illegible]

[illegible]1890—1990[illegible]3.5[illegible]17[illegible][5][illegible][6][illegible]1/5[illegible]13[illegible]1/4[illegible]31%[illegible]OECD[illegible]41%[illegible]successor state[illegible]2%[illegible]1%[illegible][7][illegible]

[illegible]20[illegible]1900—1970[illegible]1970[illegible]10[illegible]20[illegible]50[illegible]60[illegible]1970[illegible][8]

[illegible]1890—1970[illegible]1960[illegible]1960—1990[illegible]1930—1960[illegible]

20[illegible]

[illegible]——[illegible]——[illegible][9]

[illegible]4[illegible]5[illegible]44%[illegible]1900[illegible]1990[illegible]9[illegible]4[illegible]4/9[illegible]4[illegible]1980[illegible][10]

[illegible]20[illegible]20[illegible]

[illegible]

[illegible]19[illegible]20[illegible]90[illegible]1900—1940[illegible][11][illegible]meta-analysis[illegible]

> [illegible]
>
> [illegible]quantitative analysis[illegible][12]
>
> [illegible]

[illegible]20[illegible]1960[illegible][13]

[illegible]

[illegible]1500[illegible]1870[illegible]“[illegible]”[illegible]coolies[illegible]1845—1920[illegible]1925[illegible]1960[illegible]

[illegible][14][illegible]

[illegible]1870[illegible]20[illegible]

[illegible]1830—1920[illegible]5500[illegible]7000[illegible][15][illegible]1934[illegible][16][illegible]1924[illegible]1926[illegible]1929[illegible]1913[illegible]1834—1937[illegible]3000[illegible]4500[illegible]1914[illegible]“[illegible]”[illegible][17]

[illegible]1920[illegible]1500—1870[illegible]1913[illegible]bantustan[illegible]1949[illegible]1960[illegible]“[illegible]”[illegible]

□□□

□□□16□□1917□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□300□□400□□[18]□□□□□1917—1922□□1929□□□□□□□□□□□□□200□□300□□□□□□□□□□□□□□□□□□□□□□□□□□□Urals□□□□□□□□□□□□□□□□□□1927—1953□□□□□□1000□□□□□□□□□□□□□□□□□□□□□□□□□□“□□□”□“□□”□□□□□□□□□□□□□□□□□□□□□□□□□□1941□□1944□□□□□□□□□□□□□100□□□□□□□□□□□□□□□□□□□□□□Kalmyk□□

□□1953□□□□□□□□□□□□□□□□□□□□□□□□□100□□□□□□□□□□□□□□□□□□□6□□□[19]

□□□“□□□□”□transmigration□□□[20]□□□

□□□□1905□□□□□□□□□□□□□□□□□18□□[21]1905□□□□□□□□□□3700□□□□□□3000□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□1941□□□□□□20□□1941□□□□3.6□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□1942—1945□□□□□1949□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□200□□□□□□□1987□□□□□□5000□□□

[illegible]5[illegible]

[illegible]1987[illegible]460[illegible]20[illegible]70[illegible][22][illegible]imperata[illegible]20%[illegible]20[illegible]80[illegible][23][illegible]

20[illegible]Sahelian[illegible][24]

[illegible]20[illegible]

[illegible]

20[illegible]

[illegible]90%[illegible]95%[illegible]1700[illegible]5[illegible]50[illegible]

[illegible]1800[illegible]6[illegible]1650[illegible]6000[illegible]1750[illegible][25][illegible]19[illegible]80[illegible]20[illegible]20[illegible][26]8000[illegible]

[illegible]1900[illegible]43[illegible]50[illegible]1990[illegible]800[illegible]50[illegible]270[illegible]100[illegible]14[illegible]1000[illegible][27]

[illegible]17[illegible]1/10[illegible]1850[illegible]1920[illegible]1935[illegible]1960[illegible]1975[illegible]1985[illegible]1988[illegible][28][illegible]19[illegible]20[illegible]20[illegible]1960[illegible]20[illegible]30[illegible]20[illegible]80[illegible]20[illegible]70[illegible]8.2[illegible]20[illegible]3[illegible]1900[illegible]2.25[illegible]1998[illegible]28[illegible]13[illegible]

[illegible]8.2 [illegible]1890—1990[illegible]

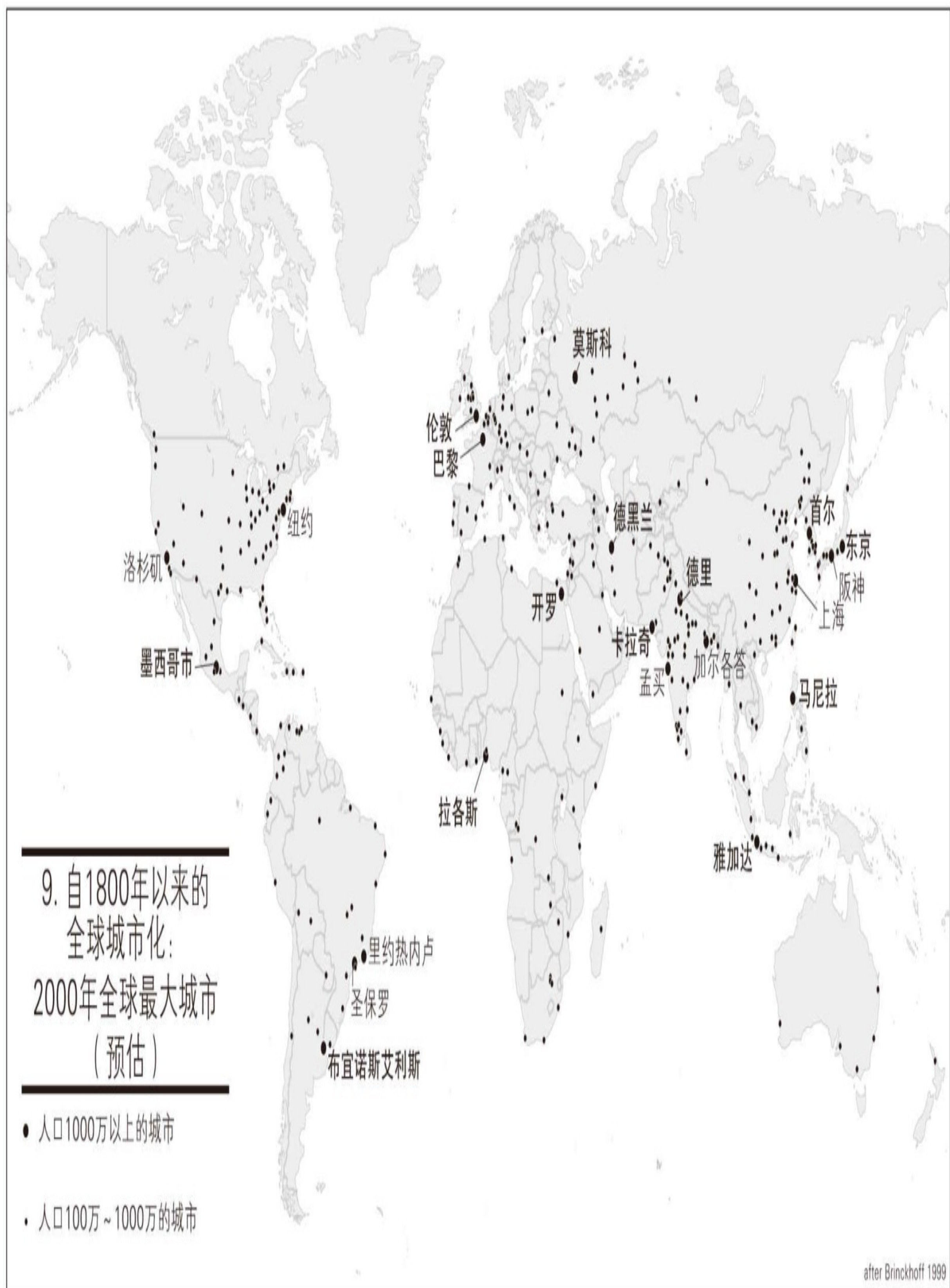
	占全球人口比重（%）					
地区	1890	1910	1930	1950	1970	1990
美国	35	46	56	64	70	75
日本	30	40	48	56	71	77
西欧	35	45	55	63	72	78
拉美	5	7	17	41	57	71
苏联	12	14	18	39	57	66
非洲	5	5	7	15	23	34
中国	5	5	6	11	17	33
南亚	5	8	12	16	21	28
全球	14	18	23	29	37	43

[illegible]Thumerelle 1996[illegible]75[illegible]20[illegible]

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]2[illegible]1[illegible]2500[illegible]


伦敦
巴黎
伊斯坦布尔
北京
东京
加尔各答
广州
9. 自1800年以来的
全球城市化：
1800年全球最大城市
人口100万～1000万的城市
人口50万～100万的城市
after Berry 1990


圣彼得堡
格拉斯哥
曼彻斯特
柏林
莫斯科
伯明翰
维也纳
伦敦
巴黎
费城
芝加哥
波士顿
纽约
北京
东京
加尔各答
9. 自1800年以来的
全球城市化：
1900年全球最大城市
人口100万~1000万的城市
人口50万~100万的城市
after Berry 1990



9. 自1800年以来的全球城市化：2000年全球最大城市（预估）
人口1000万以上的城市
人口100万～1000万的城市
莫斯科
伦敦
巴黎
纽约
洛杉矶
墨西哥市
德黑兰
德里
开罗
卡拉奇
孟买
加尔各答
首尔
东京
阪神
上海
马尼拉
拉各斯
雅加达
里约热内卢
圣保罗
布宜诺斯艾利斯
after Brinckhoff 1999

[illegible]urban metabolism[illegible][29]

[illegible]1900[illegible]1990[illegible]8[illegible][30][illegible]4[illegible]5[illegible]20[illegible]20[illegible]·[illegible]Jaime Lerner[illegible]Curitiba[illegible]

[illegible]19[illegible]——[illegible]——[illegible][31][illegible]1870[illegible]20[illegible]20[illegible]1950[illegible]3000[illegible]20[illegible]90[illegible]1/4[illegible]Maputo[illegible]220[illegible]Surat[illegible]20[illegible]90[illegible]1/5[illegible]1994[illegible]bubonic plague[illegible]56[illegible]1997[illegible][32][illegible]20[illegible]

[illegible]Staten Island[illegible]1948[illegible]20[illegible]90[illegible]20[illegible]90[illegible][33]

[illegible]1940[illegible]

[illegible]1970[illegible]

[illegible]“[illegible]”[illegible]

[illegible]1870—1920[illegible]20[illegible]90[illegible]1950[illegible][34][illegible]20[illegible]1980[illegible]1990[illegible]1820—1860[illegible][35]

[illegible] 1900[illegible]0.1%[illegible]1990[illegible]1%[illegible][36][illegible][37]

[illegible]20[illegible]1936[illegible]“[illegible]”[illegible]green belt[illegible]20[illegible]30[illegible]1950—1990[illegible][38][illegible]

[illegible]20[illegible]1887[illegible]19[illegible]20[illegible]suburbanization[illegible]1870[illegible]1920[illegible][39]

[illegible]1880—1940[illegible]——[illegible]

[illegible]1960[illegible]1910[illegible][40]

1950[illegible]1945[illegible]20[illegible]80[illegible]15[illegible]2/3[illegible][41][illegible]1990[illegible]1900[illegible]13[illegible]20[illegible]90[illegible][42][illegible]

[illegible]1830[illegible]1839—1842[illegible]150[illegible]1900[illegible]25[illegible]1950[illegible]200[illegible]1971[illegible]400[illegible]8.3[illegible]7/8[illegible]40[illegible][43]

[illegible]8.3 1971[illegible]

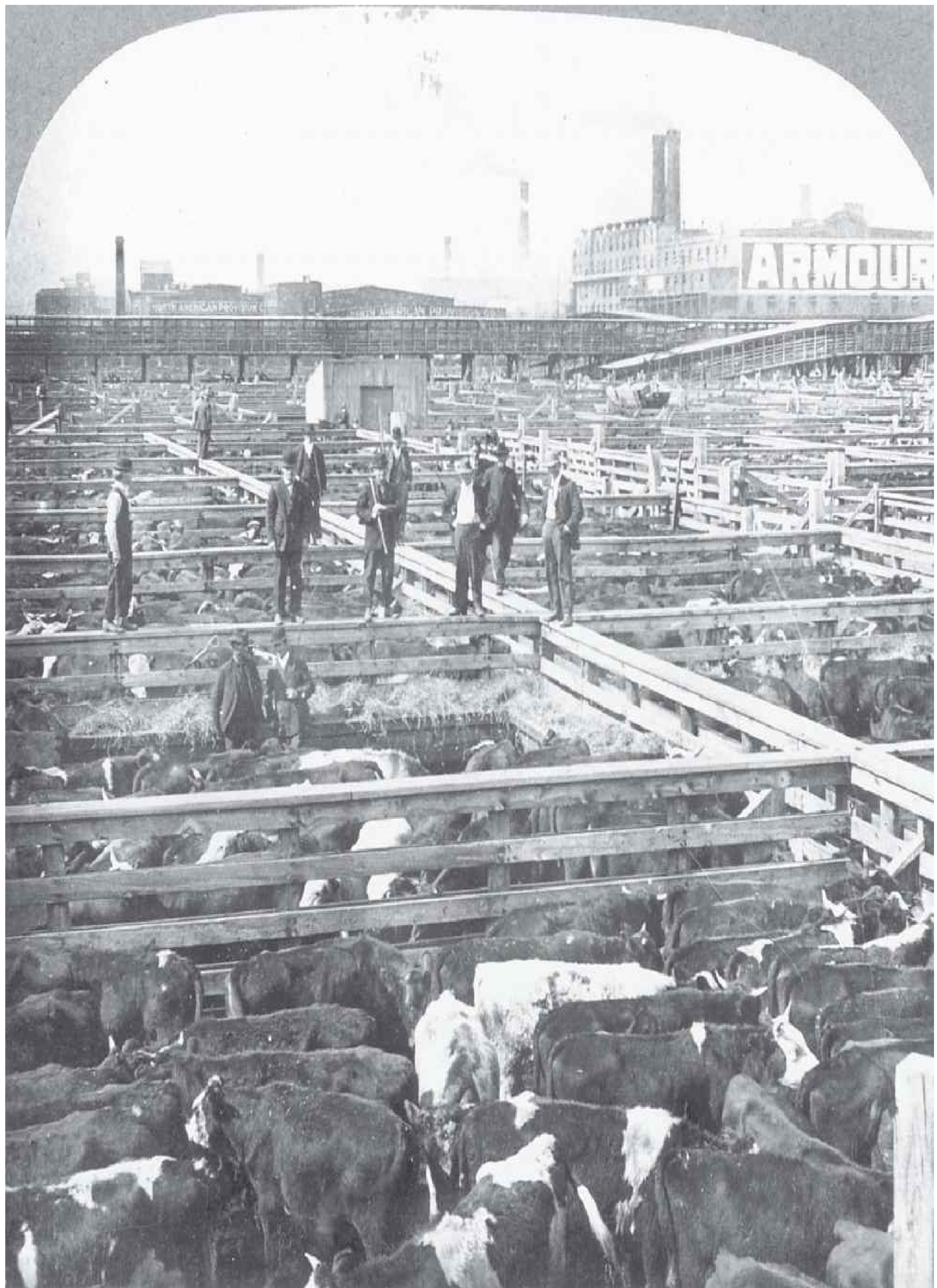
流入（单位：千吨）		流出（单位：千吨）
27	氧气	0
0	二氧化碳	26.5
0	一氧化碳	0.16
0	氧化硫	0.31
0	氧化氮	0.12
0	落尘	0.04
1068	淡水	819
0	污水	819
6.3	食物	0
11.7	汽油	0
0	厨余	0.8
0	污水渣滓	6.3
18	各种货物	8.1
0.53（8827 人）[a]	人	0.52（8632 人）[a]

[illegible]Boyden et al.1981[illegible]116–7

[illegible]a[illegible]Boyden[illegible]60[illegible]

[illegible]1850[illegible]

[44]1990[illegible]1900[illegible]30[illegible]35[illegible]1900[illegible]1940—1985[illegible]7[illegible]1960[illegible][45]


ARMOUR

[illegible]1909[illegible]1865[illegible]1900[illegible]·[illegible]Philip Armour[illegible]

[illegible]1900[illegible]1916[illegible]·[illegible]Carl Sandburg[illegible]“[illegible]”[illegible]1500[illegible]2000[illegible]20[illegible]80[illegible]700[illegible]1990[illegible]20[illegible]1960[illegible][46]

[illegible]

[illegible]20[illegible]20[illegible]20[illegible]

[illegible]

[1][illegible]30‰[illegible]35‰[illegible]10‰[illegible]12‰[illegible]

[2]Boulding 1964[illegible]135–6[illegible]1910—1993[illegible]

[3][illegible]GNP[illegible]20[illegible]

[4]Turco 1997[illegible]105[illegible]4:1[illegible]

[5][illegible]RIVM 1997[illegible]

[6]□□□
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[7]□□□□□□□□□□□□□□1890□□□
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1988□□□□□□□□□□□□□□□□□□□□44%□□□□□□□□□□□□□□□□□□□□□□□□1975□□□□□□□□□
□□□Ogawa 1991□□Darmstadter and Fri 1992□□□1973—1987□□□□□□□□□□□□□□□□□
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□□□32%□McKellar et al.1998□120–35□□□□□□□□□□□□□

[8]Lee and Feng 1999□□□□□□□□□□□□□□1978□□□□□□□□□□□□□1998□□□□□□□□□
□2.5□□□20□□60□□□□□□□□□3%□□70□□□2%□□□1996□□□□□□□□□□□1.1%□Smil 1993□
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[9]□□□□□□Repetto 1986□□□□□□1911—1983□□□□□□□□□□□□□□□□6□□□□□□□□□□□
Maurer 1968□□□□□□□□□□□□□Barker 1995□McNeill 1992b□□Mignon 1981□□1□□□□□
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[10]□□□□□□□□□□□□□□□□Falkenmark 1996□□□□□□□□□□□□□□□□□□□□□□□□□□□□□
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[11]□□□□□□□□□Campbell 1991□Grepperud 1996□□McCann 1997□□□□□□□400□
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Kummer 1991□146–9□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

[12]Palloni 1994□160.

[13]Repetto and Holmes 1983□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□20□□70
□□□□□Myers 1993□□□□□□“□□□□□□□□”□□□

[14]□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

[15]Baines 1995□Thumerelle 1996□106–7.

[16]Klein 1995□211.

[17]Zolberg 1997□288.

[18]Treadgold 1957□159–61□Chesnais 1995□221□1801—1914□□□□□□□□□□□□□
□□□□□□□□□580□□□□□80%□□□20%□□□□□

[19]□□□□□Polyakov and Ushkalov 1995□Zemskov 1991□□□□1930—1931□□□
180□□□□□Andreev-Khomiakov 1997□27–38□20□□30□□□□□□□□□□□□□□□□□□

[20]□Geertz 1963□

[21]Knapen 1998.

[22]□□
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[23]Abdoellah 1996□Hardjono 1977,1988□Levang and Sevin 1989□Rich 1994□
34–8□□□□□□□□□□□□

[24]□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□7□□□□□□□□□□□□□□□□□□
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□□□□Cordell et al.1996□

[25]Macfarlane 1997□22.

[26]□□□□□□□□□□□□□Hohenberg and Lees 1985□259□□Munch 1993□□□□□□Lee
and Feng 1999□□□□□□□□□□□□□□Hanley 1987□□20□□80□□□□□20□□□□□□□□□□□□□□
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[27]Berry 1990□104–6□WRI 1997□8–9.

[28]□□□□□□□□Clark 1998□□□□□1996□□□□□□□□□□□□□□□

[29]Berry 1990□Douglas 1994□□Gugler 1996□□□□□□□□□□□□□□□□□

[30]WRI 1997□152–3□1980—1995□□□□□□

[31]Hanley 1987□□□□□□□□17□□□□□□□□□□□

[32]□□□□□□□□WRI 1997□42–3□

[33]□□□□□□□□□□□□□1994□□□□□□□□□□□□□□25□□□□□□Trefil 1994□23□Basu 1992□□□□□□□
□□□□□□□□□□□□□□□□□□□□Melosi 1981□

[34]Abreu 1988□106,125–6□□□□□□□□□□□□□□□□□□□□□□□□□Pineo and Baer 1998□

[35]Hardoy et al.1993□1990□□□□□□□□□□

[36]Douglas 1994□□□□1990□□□□□□□□□□1900□□□□□□□□□□□□□□□□□□□□□1/3□□□□□□□□1/4□
□1900□□□□□□□□□1990□□

[37]□□Rees 1992□

[38]□□□□□□□□□□The Wall Street Journal,4 March 1993□□□□□20□□50□□□□□□□□□□□□□□□
21%□1993□□□2%□□□□□□□□□□TürkiyeÇevre Sorunlarl Vakfl1991□50□

[39]1990□□□□□□7.2□□□□□□□□□□□□□□□□□□Konvitz 1985□139□□□□□□□□□□□□□□□□□□□□□□□□
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Platt 1991□Relph 1987□St.Clair 1986□Vance 1990□□Whitehand 1987□1992□□□□□□
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[40]□□□□□□□□□Ho 1997 and Yeoh 1993□□□□□□□□□Duus 1995□□□□□□□□□□□□□□□□□□□□□
Abreu 1988□□□□□□□□□□□□Coward 1988□□□□□□□□Kosambi 1986□□□□□□□□□Low and Yip
1984□□□□□□□□□

[41]Jackson 1985.

[42]Hardoy et al.1993□115.

[43]Boyden et al.1981□□□□□□□□□Sit 1995□

[44]NRC 1992□22□□□□□□□□□□□□1990□□□□□□□□□□□□□□□□□□□□□□45%□□□□□□□□□□□□□□□□
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[45]□□□□□□□□□□□□Ezcurra and Mazari-Hiriart 1996□Pick and Butler 1997□□WRI
1997□64–5□Simon 1997□60–90□□□□□□□□Romero Lankao 1999□□□□□□□□□□□□□□□□□□□□
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[46]□□□□□□□□Cronon 1991□□□□□□□□□□□□□□□□□□□□20□□30□□□□□□□□□□□□70□□□□□□□□□□
1865—1960□□□
□□□Roberts 1994□318□□□□□□□□□Rees 1992□□□□□□□□□

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——Lucretius *De Rerum Natura*

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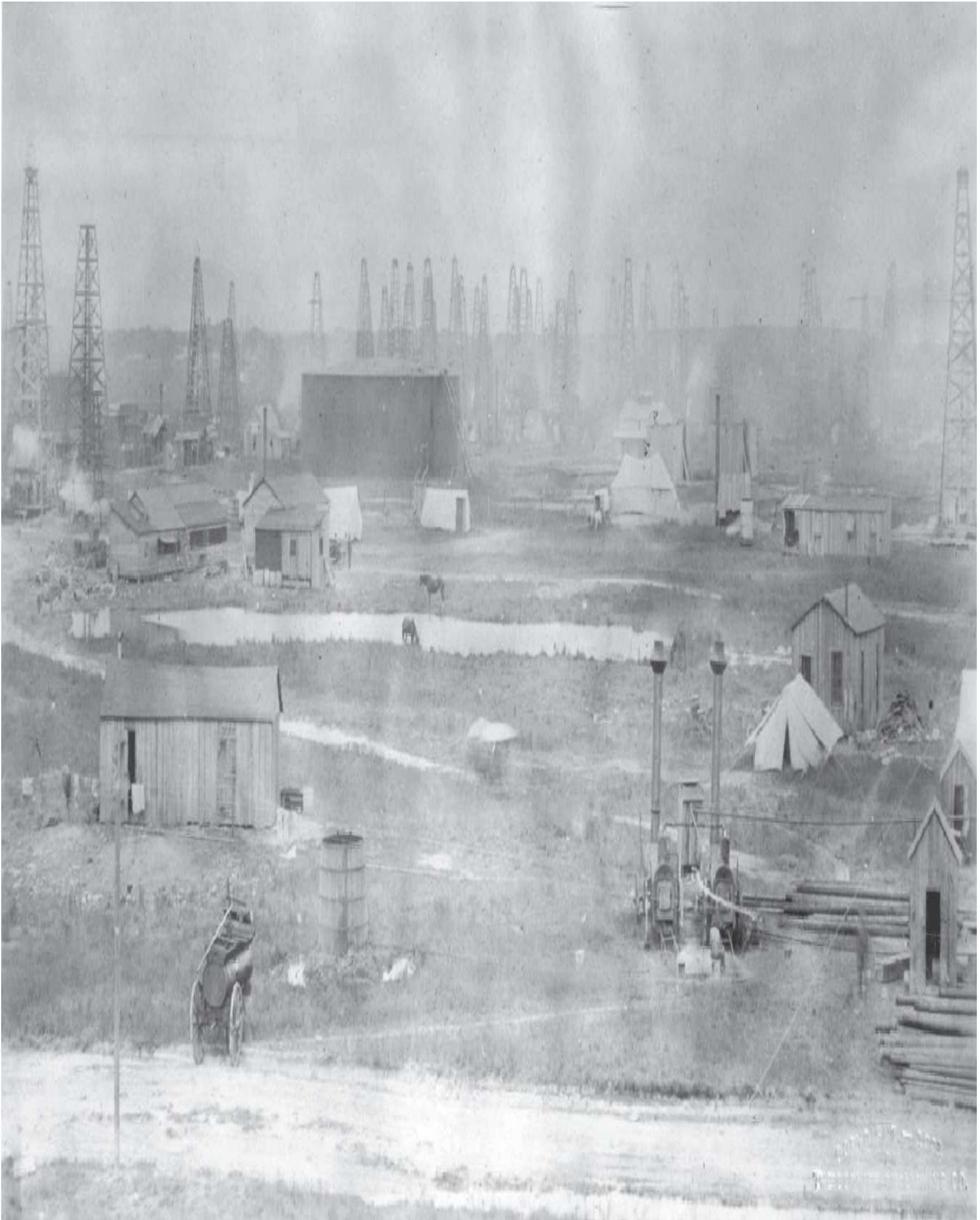
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[illegible][1][illegible]2[illegible]3[illegible]——[illegible]

1820[illegible]1950[illegible]1820[illegible]1930[illegible]50[illegible]1901—1925[illegible]

[illegible]19[illegible]20[illegible]1910—1950[illegible]1950—1970[illegible][2]1973—1984[illegible]



[illegible]Spindletop[illegible]1901[illegible]

[illegible]19[illegible]70[illegible]Baku[illegible]19[illegible]20[illegible]20[illegible]10[illegible]

[illegible]Veracruz[illegible][3][illegible]Huastec[illegible]Totonac[illegible]1906[illegible]

[illegible]1910—1920[illegible]4000[illegible]Lord Curzon[illegible]“[illegible]”[4][illegible]Tampico[illegible]1915[illegible]1919[illegible]1921[illegible]

[illegible]1897[illegible]1921[illegible]58[illegible]16[illegible]24[illegible]6[illegible]77[illegible]10[illegible][5][illegible]4000[illegible]“[illegible]”[illegible][6]



[illegible]1910[illegible]20[illegible]20[illegible]

[illegible]20[illegible]20[illegible]1938[illegible]

[illegible]1924[illegible][7]1928[illegible]1946[illegible]Lake Maracaibo[illegible]1918[illegible][8][illegible]

1973[illegible]OPEC[illegible]1979[illegible][9][illegible]1973[illegible]1985[illegible]——[illegible]——[illegible]20[illegible]70[illegible]

[illegible]1990[illegible]600[illegible]Royal Dutch Shell[illegible]British Petroleum[illegible]Shell-BP[illegible]1956[illegible]60[illegible]1965[illegible]Port Harcourt[illegible]1967—1970[illegible]Biafra[illegible]20[illegible]70[illegible]20[illegible]80[illegible]Ogoni[illegible][10][illegible]20[illegible]90[illegible]80%[illegible]90%[illegible]1992[illegible]1995[illegible][11][illegible]20[illegible]

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北冰洋
北冰洋
太平洋
大西洋
印度洋
艾柏塔
南加州
得州—俄克拉荷马
斯平德乐塔普
墨西哥外海油田
坦皮科
马拉开波湖
北海
普洛什特
乌拉尔
西西伯利亚
巴库
阿尔及利亚
利比亚
阿拉伯及中东
中国油田
尼日河三角洲
卡宾达
婆罗洲外海油田
苏门答腊
10. 自1900年以来的主要油田
1940年以前的重要油田
1973年的重要油田，不含1940年之前
1973年以后的重要油田

[illegible] 20[illegible]1970[illegible]5[illegible]Battle of the Atlantic,1942[illegible]1—6[illegible]6[illegible]60[illegible]1945—1977[illegible]30[illegible]1967[illegible]Torrey Canyon[illegible]Cornwall[illegible]12[illegible]20[illegible]80[illegible]1990[illegible]20[illegible]90[illegible]1989[illegible]Exxon Valdez[illegible]3.4[illegible]1990[illegible]10[illegible][12]

[illegible]1979[illegible]Tabasco[illegible]Ixtoc I[illegible]60[illegible][13]

[illegible]1919—1939[illegible]1945—1973[illegible]1984[illegible][14] [illegible]20[illegible][15][illegible]20[illegible]50[illegible][16]

[illegible]

[illegible]·[illegible]Oscar Wilde[illegible]

[illegible] [17]

[illegible]20[illegible]20[illegible]

[illegible]20[illegible]20[illegible]20[illegible]

[illegible]

[illegible]1858[illegible]1917[illegible]1950—1955[illegible]1950[illegible]1955[illegible]1958[illegible]20[illegible]50[illegible]“[illegible]”[illegible][18]

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20[illegible]20[illegible][19]

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[illegible]1920[illegible]1/4[illegible]
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[illegible]1[illegible]1.5[illegible]1910[illegible]
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Les Bois du Cameroun

[illegible]1950[illegible]Eseka[illegible]
[illegible]1950—1990[illegible]20[illegible]

[illegible]20[illegible]1896[illegible]1995[illegible]5[illegible]2[illegible]3[illegible]——[illegible]——[illegible]6[illegible]

[illegible]20[illegible]90[illegible]29[illegible]10[illegible]1990[illegible]10%[illegible]30%[illegible]1/2[illegible]2/3[illegible][21]

[illegible]1900[illegible]1990[illegible]500[illegible]10[illegible]15[illegible]1920—1980[illegible]1916[illegible]20[illegible]30[illegible]40[illegible]1956[illegible]1990[illegible]5%[illegible]10%[illegible][22][illegible]1%[illegible]2%[illegible]

[illegible]1925[illegible]2.5[illegible]5[illegible]200[illegible]300[illegible]20[illegible]5[illegible]6[illegible]20[illegible]40[illegible][23]

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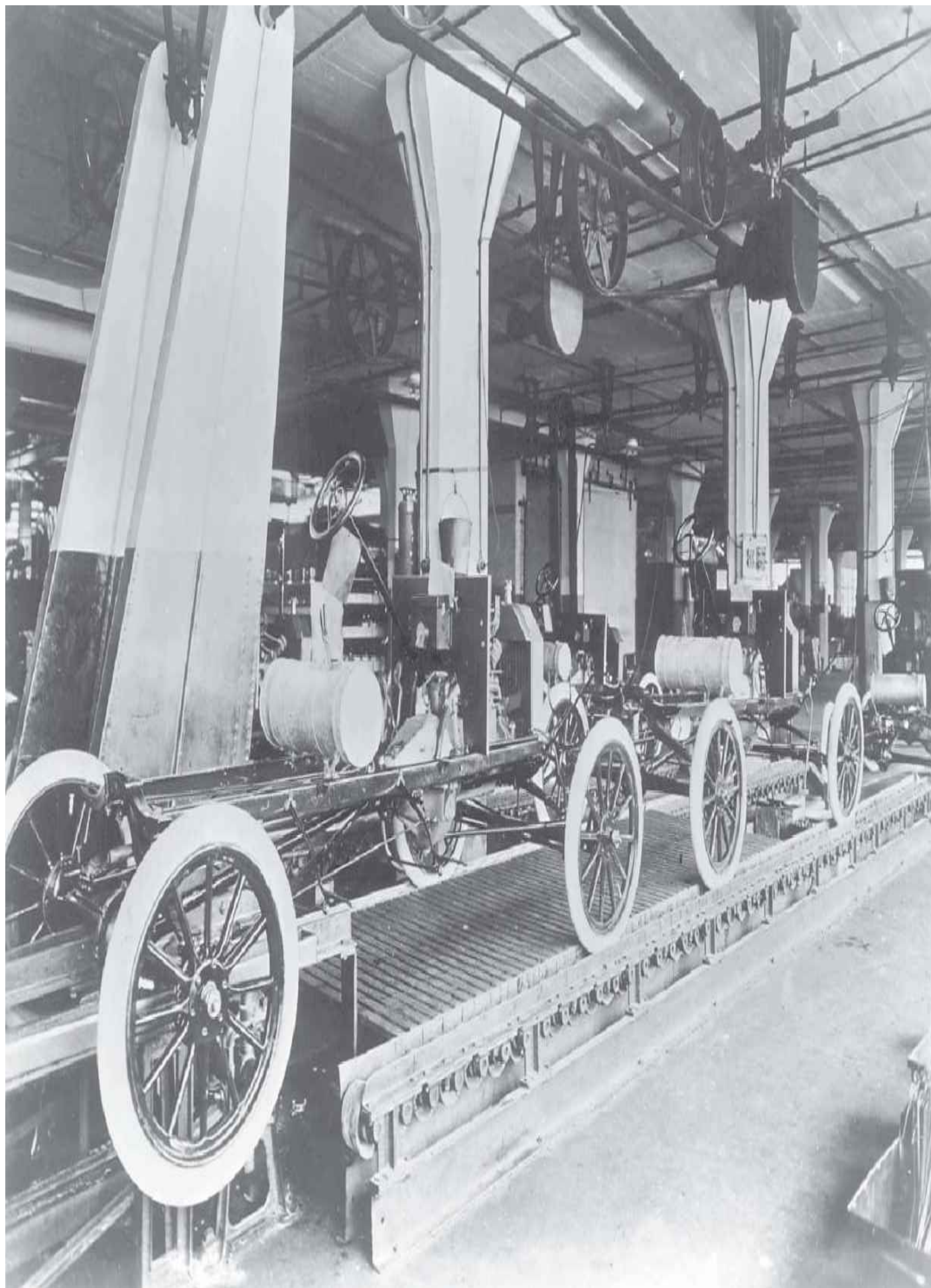
[illegible]“[illegible]”[illegible]decarbonize[illegible]“[illegible]”[illegible]dematerialization[illegible]GDP[illegible]1850—1880[illegible][29][illegible]

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[illegible]social arrangements[illegible]1912[illegible]1925—1960[illegible]1950—1970[illegible]1980[illegible]20[illegible]20[illegible]



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[illegible]1935[illegible]“[illegible]”[illegible]

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[1]Bourgeois et al.1996[illegible]20[illegible]50[illegible]Ghent[illegible]

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[3]□□□□□□□□Santiago 1997 and 1998□

[4]Melosi 1985□151-2.

[5]Santiago 1997□□□□□□□1924□□□□□

[6]Santiago 1998□182□□□□□□Plutarco Elías Calles□□□□□□□1921□□□□

[7]Melosi 1985□97.

[8]Vitale 1983□95□□□□□□□□Etemad and Luciani 1991□

[9]1948□□□□□□□□□□□Tatarstan□□□□□□□□□□60□□□□□□□□□□□□□□□□□□□□□□□□□□□
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[10]Salau 1996□257–8□□“□□”□□□□□1976—1988□□□□□□□□□□□□□□200□□□□□□□
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[11]□□□□□□□□□Lowman and Gardner 1996□Osaghae 1995□

[12]□□□□□□□Holdren 1991□124□□□□□Buxton 1993□Earle 1995□261—91□
Gorman 1993□119□□ReVelle and ReVelle 1992□408–11□

[13]Burger 1997□□□□□□□□□□□

[14]1992□□□□□□□□□UNDP□□□□□□□□□□10□□□□□□□□□□□10□□□□150□□□□□□□□□25
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[16]□□□□□□□Pfister’s□1995□□

[17]Silversides 1997□1□□□□

[18]Ibid.□□□□□□□□□Silversides 1997□107□□□□□□□□□□□□□□□□·□□□□□Armst
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[20]□□□□□□□□Grübler and Nakičenovič 1991□56–7□□□Lay 1992□131–3□1900□□
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[21]□□□□□□□□□Tucker□□□□□□□□□□□□□□□□□□□Dean 1987□□□□□□□□□□□□·□□□□□
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[23]□□□□□□□□□□□Freund and Martin 1993□Jackson 1985□157–71,246–71□Kay
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[24]Berkhout 1994□324□□94%□□□□□□□□□□□□□

[25]The Economist□28 March 1998□63.

[26]Savchenko 1995□2□□□□□□□□□□□□□□□□1.4□□45.5□□□□□□□□□□□pp.78–84□□
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[27]Grübler 1994□44.

[28]Ayres 1989□□□□20□□80□□□□□□□□□□□□□□□□10□□□□□□□□□□□94%□□□□□□□□□□
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[33] 1955 20 80

[34] http //www.mamba.bio.uci.edu 1997 10 2 University of California-Irvine ·J. Peter J.Bryant

[35] · Augelli 1989 Dean 1995 McNeill 1988 Amanor 1994 Dourojeanni 1989 McNeill 1992b maquiladoras Nuccio and Ornelas 1987 Mander and Goldsmith 1996

[36] Berkes 1992 Ostrom 1992

[37] Polonoroeste Carajás Sing rau li 5 Wade 1997 Rich 1994 Bayalama 1992

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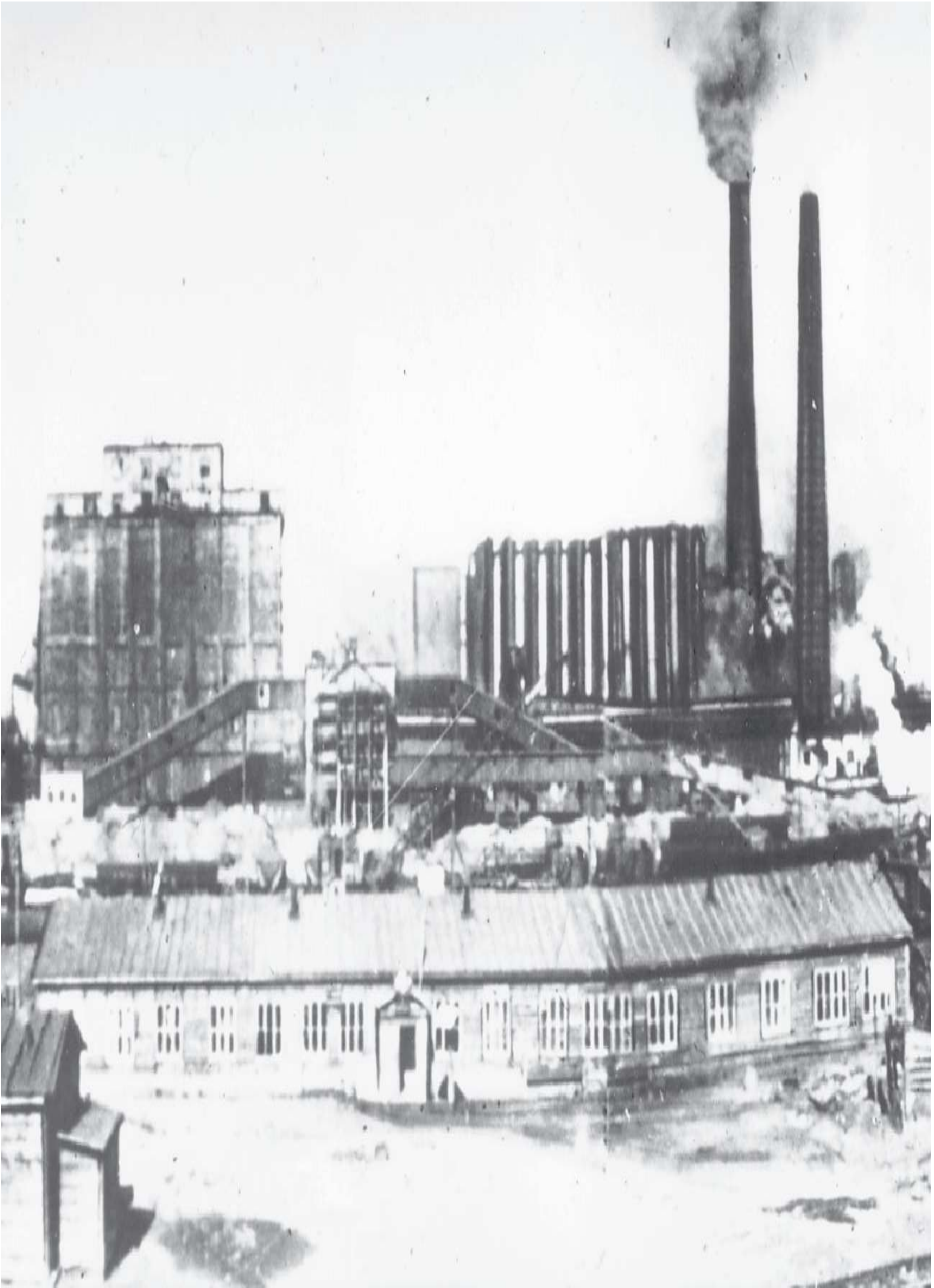
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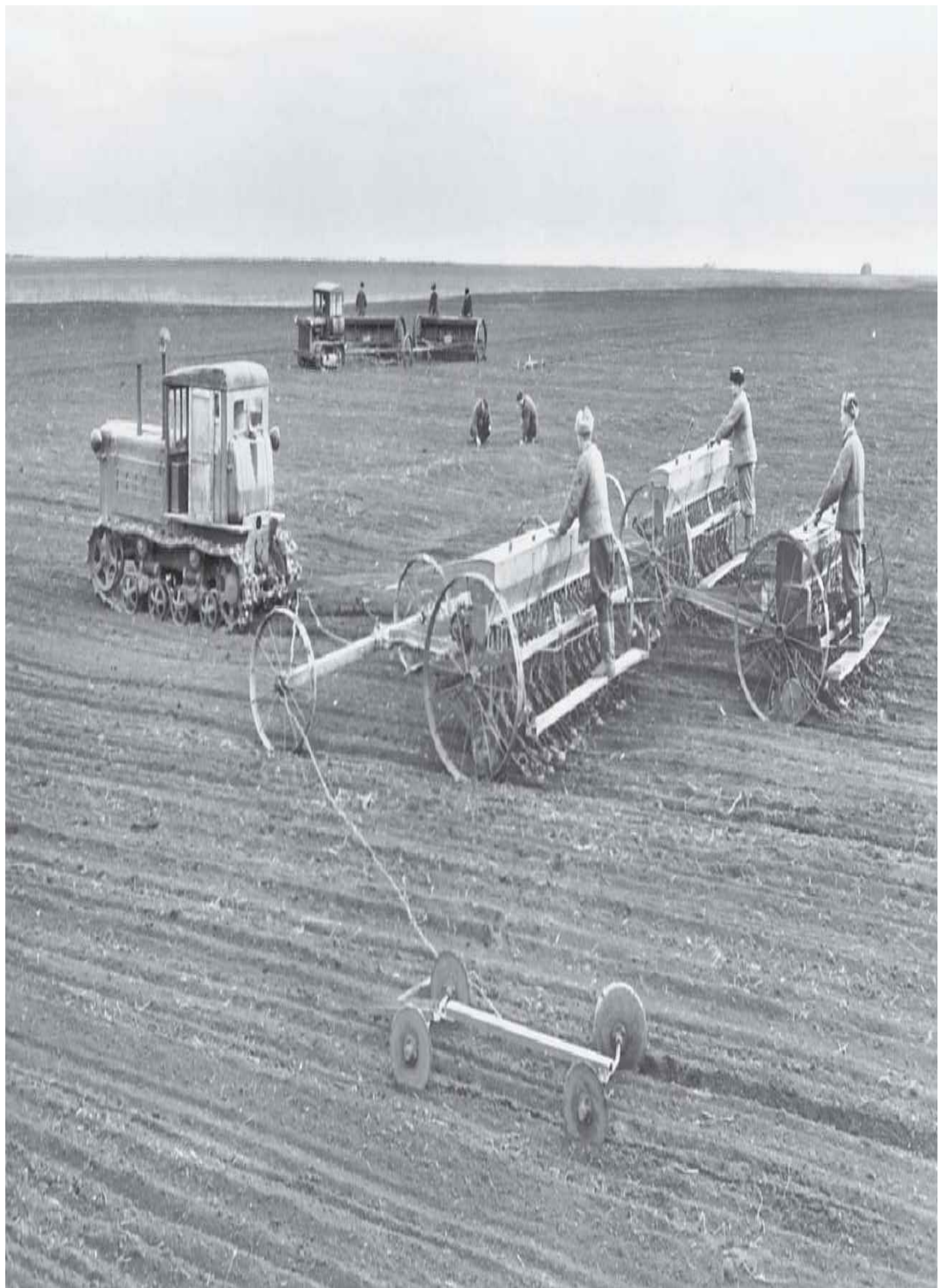
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20[illegible]60[illegible]1945—1973[illegible][24]


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1962[illegible]·[illegible]1962—1963[illegible]1963[illegible]

[illegible]·[illegible]Rachel Carson[illegible]1907—1964[illegible]1962[illegible]*Silent Spring*[illegible]the Borgias[illegible]1963[illegible]——[illegible]DDT[illegible]——[illegible][25]

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[illegible]20[illegible]

[illegible]9[illegible]7[illegible]/[illegible]

[illegible]3000[illegible]1000[illegible]Hanford Engineering Works[illegible]50[illegible]1949[illegible]“[illegible]”[illegible]green uranium[illegible]

[illegible]20[illegible]“[illegible]”[illegible]Green Run[illegible]8000[illegible]—131[illegible]80[illegible]1000[illegible]1986[illegible][33]

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[illegible]command economy[illegible]4.5[illegible]1949—1991[illegible]715[illegible]Semipalatinsk[illegible]Novaya Zemlya[illegible]1972[illegible]1984[illegible]Archangel[illegible]Northern Fleet[illegible]

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20 [illegible]·[illegible]·[illegible] William Tecumseh Sherman [illegible] 1820—1891 [illegible] 1921—1926 [illegible] the Berbers [illegible] napalm [illegible] 1944—1949 [illegible] 20 [illegible] 50 [illegible] Agent Orange [illegible] 1979 [illegible][40]

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[illegible][41]

[illegible]20[illegible]90[illegible][42][illegible]

[illegible]20[illegible]sisal[illegible]20[illegible]40[illegible]Tanganyika[illegible][43]

[illegible]

[illegible]20[illegible]70[illegible]80[illegible]90[illegible][44]



[illegible]1947[illegible]

[illegible]1949[illegible]International Harvester Company[illegible]R.H.Reishus[illegible]

[illegible]20[illegible]——[illegible]——[illegible]20[illegible]20[illegible]

[illegible]

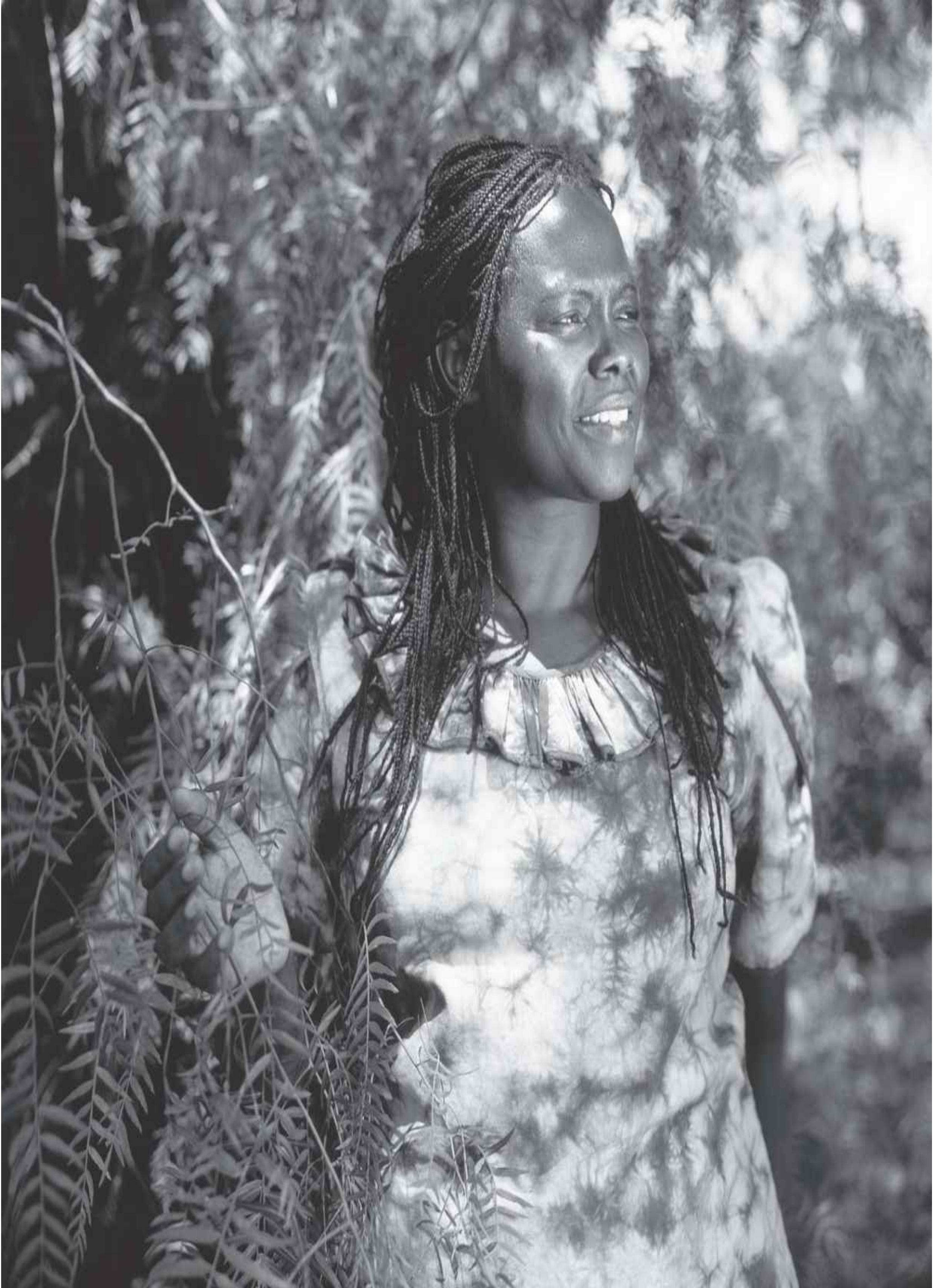
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20[illegible]20[illegible]60[illegible]70[illegible]20[illegible]60[illegible]Values Party[illegible]15[illegible]1973[illegible]1967[illegible]1970[illegible]1972[illegible]

[illegible]1980[illegible]civil disobedience[illegible]20[illegible]80[illegible]

[illegible]——[illegible]——[illegible]Chipko Andalan[illegible]Green Belt[illegible]1977[illegible]1981[illegible]1987[illegible]·[illegible]Wangari Maathai[illegible]1993[illegible]2000[illegible][47]

[illegible]1981—1984[illegible][48][illegible]1983[illegible]1998[illegible]corporatist[illegible]consensual politics[illegible]1989[illegible]agribusiness[illegible][49]



[illegible]1987[illegible]Brundtland Report[illegible]Montreal Protocol[illegible]1987[illegible]20[illegible]60[illegible]“[illegible]”[illegible][50]

[illegible]1967[illegible]scrubber[illegible]

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20[illegible]20[illegible]

1970

[1]

[2]·9 1–3 “ ” 31 20 “ ”

[3]White 1967 Tuan 1968 Asquith and Kalland 1997 Bruun and Kalland 1995 Hou 1997 Livingstone 1994 Toynbee 1972 Zaidi 1981

[4]Ehrenfeld 1978 Merchant 1980 Opie 1987

[5]1850

[6]Prager 1993 61–2

[7]Patrick Abercrombie Buller 1992 70

[8]Walter 1989.

[9]Gröning and Wolschke-Bulmahn 1987a,1987b,1991 · Daniel Inkelas Nolte 1966 419–20 Rollins 1997

[10]Kizaki 1938.

[11]1922—1943 1/3 McNeill 1992b 337–8 · General Ioannis Metaxas 1939 Metaxas 1969,2 214–9 Salazar Brouwer 1995 Iron Guard “ ” Bramwell 1989 162

[12]Weiner 1988 and 1999 355–73

[13]Shiva 1991a 17 Guha and Martinez-Alier 1997 156 8

[14]Chesnais 1995 171–73,177–8

[15]Ipsen 1996 Quine 1996

[16]Ponting 1991 157–8 Manuel 1995 163 Hillel 1991 294–5 · Che Guevara “ ” Washington Post Book World,19 October 1997 10

[17]Andreev-Khomiakov 1997 29–38.

[18]Oschlies 1985 Ordos 1991 Jele.ek 1988,1991 Stebelsky 1989

[19]Adabashev 1966 110–4

[20]1974 · Robert Solow Rees 1992 123 · Julia Simon Dryzek 1997 48

[21]Costanza 1997 Krishnan et al.1995 MartinezAlier 1987

[22]· Aldo Leopold A Sand County Almanac 1949

[23][illegible]Bramwell 1989[illegible]Corvol 1987[illegible]Deléage 1992[illegible]Glacken 1967[illegible]Graaff 1982[illegible]Grove 1994[illegible]Hermand 1991[illegible]Ditt 1996[illegible]Pepper 1996[illegible]Teich et al.1997[illegible]Votruba 1993[illegible]Worster 1977[illegible]

[24][illegible]

[25]Lear 1997[illegible]Admiral Mahan[illegible]

[26][illegible]1946[illegible]DDT[illegible]

[27][illegible]·[illegible]Marvin Gaye[illegible]·[illegible]Joni Mitchell[illegible]Alabama[illegible]

[28][illegible]Oliver 1992[illegible]The Economist,21 December 1996[illegible]108–9[illegible]

[29][illegible]1997[illegible]2000[illegible]

[30][illegible]Environics International[illegible]Washington Post,22 November 1997[illegible]A15[illegible]Guha and Martinez-Alier 1997[illegible]

[31][illegible]·[illegible]Luc Ferry[illegible]1995[illegible]deep ecology[illegible]300[illegible]

[32][illegible]Amat 1993[illegible]Wood and Schmink 1993[illegible]Pichón 1992[illegible]Lewis 1997[illegible]Gifford 1998[illegible]Ispahani 1989[illegible]145–213[illegible]Ali 1988[illegible]

[33]Gerber 1992.

[34]Fioravanti and Makhijani 1997[illegible]USDOE 1995.

[35]Cochrane et al.1993[illegible]Nilsen and Bohmer 1994[illegible]Nilsen and Hauge 1992[illegible]Yablokov 1995[illegible]Holloway 1994[illegible]1956[illegible]

[36][illegible]Danielsson 1990[illegible]Makhijani et al.1995[illegible]

[37]Smil 1994[illegible]185.

[38][illegible]ecological succession[illegible]100[illegible]Westing 1980[illegible]97–8[illegible]

[39]Clout 1996[illegible]Sobolev 1947[illegible]Westing 1990[illegible]1994[illegible]Burger 1997[illegible]69–73[illegible]Hawley 1992[illegible]Hobbs and Radke 1992[illegible]Aarsten 1946[illegible]17%[illegible]ElShobosky and Al-Saedi 1993[illegible]1941—1943[illegible]1991[illegible]desert crust[illegible]

[40]Demorlaine 1919[illegible]McNeill 1992b[illegible]260–70[illegible]Prochaska 1986[illegible]Westing 1990.

[41]Celi 1991[illegible]Opie 1993[illegible]96[illegible]Kuusela 1994[illegible]125[illegible]The Economist,17 June 1995[illegible]35[illegible]20[illegible]80[illegible]300[illegible]Azhar 1985[illegible]Allan 1987[illegible]

[42]Westing 1980[illegible]154[illegible]Turner et al.1990[illegible]Environment 35[illegible]4[illegible]22[illegible]

[43]Adams 1992[illegible]104[illegible]Hogendorn and Scott 1981.

[44][illegible]Jänicke and Weidner 1996[illegible]Lafferty and Meadowcroft 1996[illegible]

[45][illegible]1689—1725[illegible]1762—1796[illegible]Massey 1992[illegible]16–17[illegible]

[46]Dorsey 1998.

[47]Gadgil and Guha 1995[illegible]Guha 1990[illegible]Guha and Martinez Alier 1997.

[48][illegible]·[illegible]James Watt[illegible]

□apocalypse□□□□□□□□□□□□□□□□□·□□□□Donald Hodel□□□□□□□□□□□□□□□□□□□□□□□□□□□
□□□□□Rothman 1998□187–9□□

[49]□□□□1970—1995□□□□□□□□□□□□Bührs and Bartlett 1994□Broadbent 1998□Cramer 1989□Dalton 1994□de Jongh and Captain 1999□Dede 1993,Diani 1995□Hays 1997□Lee and So 1999□Rothman 1998□Stevis 1993□Villalba 1997□□Votruba 1993□

[50]□□□□□□□Tolba and El-Kholy 1992□737–98□□Young 1997□□□□□□□□□□□□□□□□
Bibliography under WCED 1987□□□□□□□□□□□□·□□□·□□□□□Gro Harlem Brundtland□□□□□

[51]OECD 1998.

[52]Humphrey and Sneath 1996,vol.1.

[53]Lee and Feng 1999.

[54]Shao 1986□□□□□□□□□□□□□□1969—1975□□□□□□□80%□□□□□□□□□□□□□□□·□□□□Julius Nyerere□“□□□□□□”□□□□□□□□□

[55]□□□□□□□□□□□Dryzek 1997□Jänicke and Weidner 1996□Karan 1994□McCormick 1991□Mandrillon 1991□Panjari 1997□Price 1994□□Tolba and El-Kholy 1992□

[illegible]

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1930[illegible]·[illegible]Robert Millikan[illegible]1868—1953[illegible][1][illegible]·[illegible]“[illegible]”[illegible]

[illegible]“[illegible]”[illegible][2][illegible]

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[illegible]11.1 [illegible]20[illegible]

项目	19 世纪 90 年代—20 世纪 90 年代增长率
全球人口	4
城市占全球人口比	3
全球城市人口	13
全球经济	14
工业产出	40
使用能源量	13
煤炭产量	7
空气污染	≈ 5
二氧化碳排放	17
二氧化硫排放	13
排放至大气圈的铅量	≈ 8
使用水量	9
海洋渔获量	35
牛群数量	4
猪群数量	9
马匹数量	1.1
蓝鲸数量（限南冰洋）	0.0025（减少 99.75%）
长须鲸数量	0.03（减少 97%）
鸟类与哺乳类物种	0.99（减少 1%）
灌溉面积	5
森林面积	0.8（减少 20%）
耕地	2

[illegible]

[illegible]·[illegible]20[illegible]20[illegible]

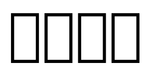
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20[illegible]

[illegible]20[illegible]

[1]Hobsbawm 1994[illegible]534[illegible]
[2]Elvin 1993[illegible]
[3]McGovern 1994[illegible]15[illegible]10[illegible]12[illegible]enclave[illegible]Little Ice Age[illegible]Inuit[illegible]



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